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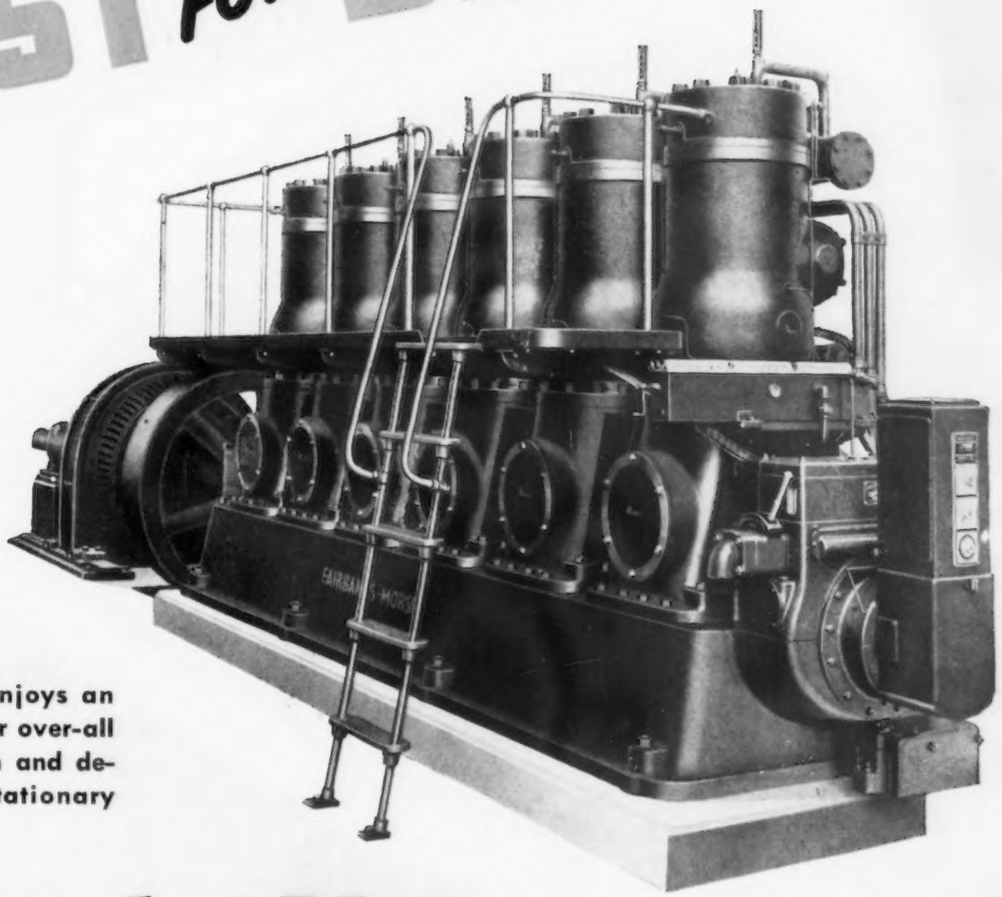

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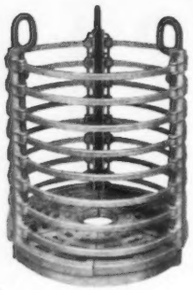

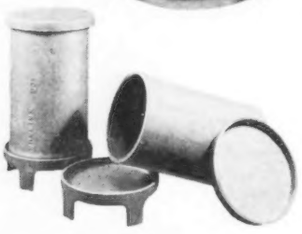

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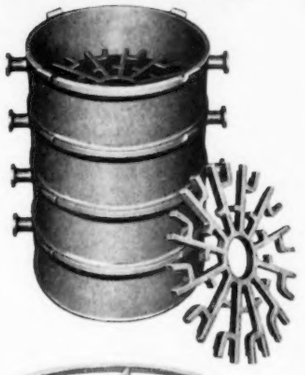

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THE WEEKLY NEWS MAGAZINE OF THE METALWORKING INDUSTRIES

IRON AGE

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Goodbye, Little Man

WHEN there is a neighborhood scrap, it is nice to have some big boys on your side. They bear the brunt of the battle. That is what happened to us in the recent war.

If we had not had big boys like U. S. Steel, General Motors, General Electric and others in that category to turn out mountains of steel and munitions we would have been out of luck. That is by no means discounting the effort of the little boys, who collectively and in measure of their size and strength, did an equally outstanding job.

The point I want to make is that if you are going to have big boys to fight your battles in the future, you must see to it that the little boys have a chance to grow up. Because little boys are the only material that has been discovered of which you can make big boys.

We have heard a great many people, in Washington and elsewhere, profess affection and declare championship for the little businessman and the small manufacturer. And that is perfectly fine, provided what is done equals or approaches what is said. But unfortunately, as things have been during the past few years and as they are today, the little businessman and the little shop owner is on the way out. They are being ground between two millstones; one, organized labor and the other the OPA. It is difficult to say which one is their worst enemy.

Recently you may have seen in the newspapers an eloquent statement from a small manufacturer who made zippers. I put it in the past tense advisedly. He cannot make zippers today even though he would like to and although many people want them to keep their garments from blowing away in the high winds. The reason he cannot make zippers is that he cannot get materials with which to make them. The reason he cannot get these materials is not because people are unwilling to make and sell them to him but simply because such people cannot do that and hope to stay in business, thanks to the OPA price regulations. He believes that reversion to the old reliable law of supply and demand would do a better job for him and for his customers than the artificial regulations of OPA and I agree with him. Let more people make more things and competition will take care of protecting the public as to price.

My friend, William C. Miller, president of the Miller Dairy Products Co., who supplied me with milk when I lived in Darien, Conn., has just given up his business. In this case the deadly instrument that killed this 20-man concern was the AFL. They said that he and his two brothers would not be allowed to do manual work, as they had been doing and must increase their pay scale by 50 pct.

Says friend Miller in a published letter to the union head:

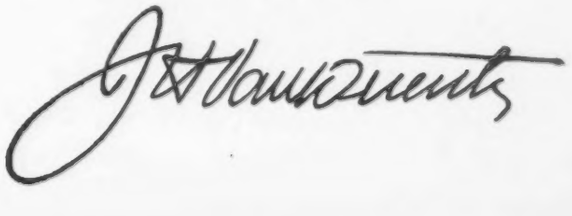
"Ours is a little local business like thousands of other little local businesses which are struggling to keep going. This country needs those little local businesses and the jobs which they create—needs to have them continue on as going concerns.

"You 'organized' our men; you 'persuaded' them that you could get more money for them despite the fact that any businessman could readily have told you that the money was not there.

"You have won a brilliant victory. I applaud you. But what is that victory? The golden goose is dead—the eggs no more.

"Seriously, my brothers and I feel very badly that we will have to close our doors; that the business which we have built up with no little effort and all our money will be gone. Yet, if our closing shall in some little way open up the eyes of but a few of the large majority of people in these United States who are not connected with management nor with labor unions and make them realize that sooner or later one small business after another will go the way of ours unless they, the people, do something about it. If that can come to pass it will in some measure recompense us for our loss."

Goodbye, little men; it's nice to have known you!



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INLAND STEEL

The IRON AGE
Feb. 5, 1946

NEWSFRONT

► A simple spot test for determining molybdenum content in steel scrap is being sought by the industry. Spark tests for molybdenum are not effective because as little as 0.001 pct shows positive results.

► Even while metallurgists searched for new and better alloys to meet the heat and corrosion problems presented by modern airplane engines, a new ceramic development when applied to conventional steels will withstand the high temperatures of exhaust stacks and provide the necessary resistance to corrosion.

► The policy of the retiring chief of Army ordnance is to declare all warbuilt industrial facilities surplus and none to be retained in standby condition. General Campbell considers that funds could not be obtained from Congress for maintenance, and the plants will be available for emergency use if sold to private industry.

► It appears that the condition of Malayan tin mining facilities is better than had been anticipated. Forty-one dredges are expected to be ready by August 1946 and 46 by June 1947.

Welding of 18 - 8 stainless to pure molybdenum tubing has been accomplished by Aerojet Engineering Corp. by the heliarc method.

► A malleable magnetic alloy having 75 to 80 pct of the coercive force of Alnico, which must be sintered, has been developed. The composition is a well known alloy containing roughly 60 pct copper, 20 pct nickel, 20 pct iron. The trick in the rolled magnetic alloy is in its treatment.

► A new hard surfacing alloy for acetylene torch application to steel contains tantalum-columbium carbide which it is reported imparts self-lubricating properties at elevated temperatures.

► Boron carbide in massive shapes is generally hot pressed from powder at about 2300-C. in carbon resistor or high frequency furnaces. Finishing to size is done by diamond wheels and polishing by final diamond dust lapping. Finished shapes are relatively expensive but often warrant their cost by production merits.

► RCA is testing thoriated tungsten wire by means of Geiger counters. Intensity of ionization produced within the counter by thorium radiation is an indication of the amount of radioactive element present. These pulses, transferred into audible signals, indicate the quality of the wire.

► Solid tungsten carbide bearings have been employed in precision grinders. These bearings have cylindrical and conical surfaces, the load being supported by the latter. A mixture of kerosene and colloidal graphite is used for lubricant. The carbide to carbide bearings have seen service at spindle speeds of 5,000 rpm, 16 hr a day, for over a year with wear of but 0.000004 in.

► Freemachining Stainless, 18-8 containing Selenium, is reported to be subject to unpredictable variations in characteristics. If remelted, an unsatisfactory heat will most likely turn out satisfactory without any apparent modifications of technique.

► United States practice in recording on wire is to use a modified 18-8 stainless steel. Investigators are working now on the practicability of a self-lubricating stainless wire.

A system that was in general use on the German radio, and by the Reich Army and Navy for mobile, fixed station and haversack front line recording was based on a film of Polyvinal Chloride coated with a compound containing Iron Oxide. Passing the tape across the gap of a small armature, whose field strength varied with the volume of amplified sound, magnetizes the particles of Iron Oxide to varying degrees. In playing back, the process is reversed. The tape can be cleared for re-use by passing it over a properly magnetized armature. It is said that the apparatus will record and reproduce frequencies as high as 10,000 C.P.S. About 6000 tapes per month were produced.

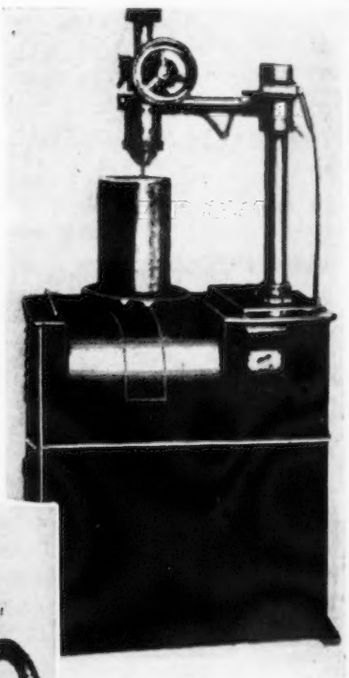
A significant improvement appears to be a unit which will scan for eight hours, recording on an 8½ in. by 11 in. plastic sheet.

Arcwelding Trends In Wartime Germany

By CAPT. F. W. MYERS, Jr.
Chief of Welding, Research and Development Division, U. S. Army Transportation Corps.

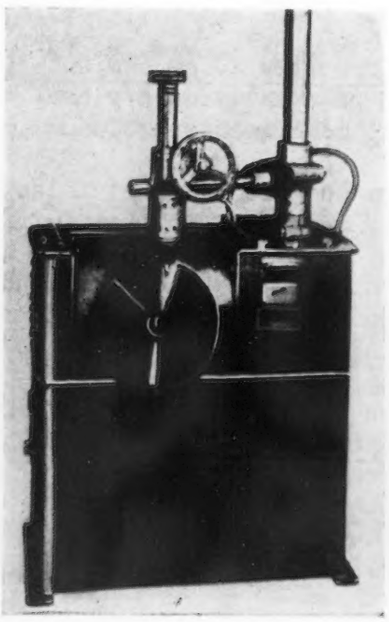
THE German welding industry apparently did not know what its requirements would be prior to the beginning of the War. Not until 1940 were efforts made to educate unskilled people in courses lasting several weeks, with an average course lasting five weeks. It was found by experience that people wholly strange to the profession, barbers, waiters, upholsterers, etc., showed a surprising aptitude and good performance when they were given simple work, and were used only for depositing weld metal. Due to the lack of men, women were used to a constantly increasing extent throughout the War. While they often proved successful in oxyacetylene welding, and indeed surpassed the work of men where a light and steady wrist is important, the results with electric arcwelding were very different. For example, many women could not overcome fright caused by the noise effect of the crackling arc. German industry therefore did not have the success achieved in America, in the use of women, in electric arcwelding. On the other hand the use of women on resistance-welding machines in Germany, preferably on spot-welding machines, which require only a few days instruction, turned out very well.

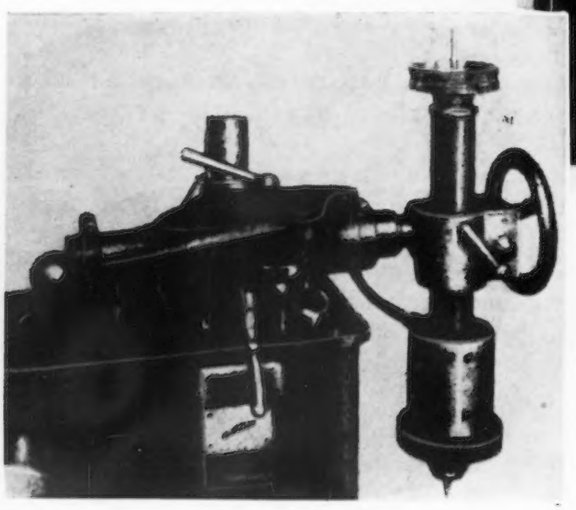
Since the above measures were not sufficient for war production, it was necessary for German industry to have recourse to foreigners, and prisoners of war or slave labor, although the efficiency of the training was very low because of natural antagonism, and other problems. According to the German plan, the aim of the instruction was limited, compared with usual courses in welding technique, and as a result it was necessary for the Germans to give the workmen new courses whenever the type of welding rod, welding joints, or the welding sequence changed. Only a few people of this class of worker, who were



RIGHT

FIG. 2—The same machine as shown in fig. 1, but with the turntable swung into the horizontal position. Current source is an ordinary transformer with a range from 20 to 300 amp.





LEFT

FIG. 1—Carbon arc circular-seam welding machine for use on light-section material. Equipped with an adjustable head and a power-driven turntable, it is only semiautomatic in operation.

LEFT

FIG. 3—Close-up of the welding head showing the manual adjustments and arrangement for turning the carbon by hand to insure even burning.

Shortage of welding engineers and trained personnel proved a serious handicap in the production of welded products in Germany, but in spite of this, no real effort was made to train all-around workers. No new developments of any importance were made during the war, and there was but little use made of automatic equipment. Some interesting work, however, was done by the railroads in the production of welded passenger coaches, gondola cars, and frameless tank cars.

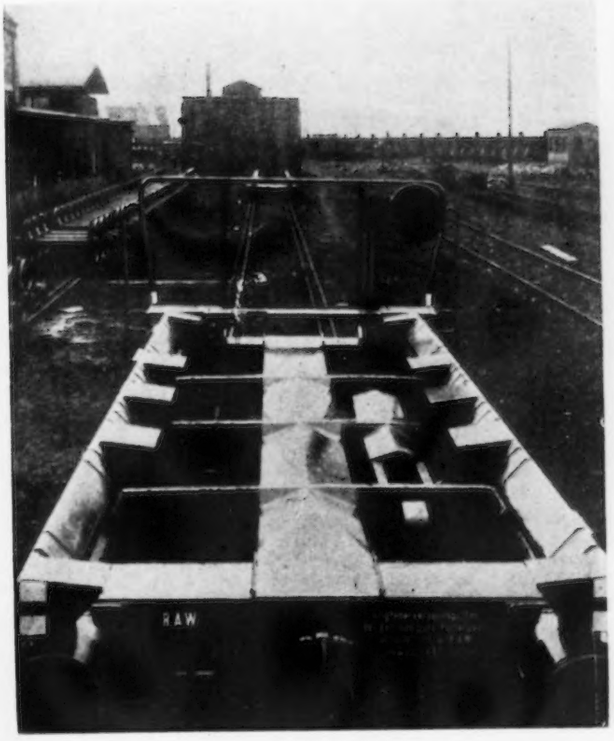


FIG. 4—Underframe of German gondola car of welded construction in which the frame acts as a supporting structure for the gondola.

above average intelligence, were instructed in special courses that enabled them to be used on all types of welding.

While it was possible by these methods to meet increasing demands for welders during the war, with a minimum of delay, the same cannot be said about welding superintendents and engineers. The welding industry could not even fill the normal peacetime requirements in Germany, to say nothing of the additional load of wartime demands. This lack of welding engineers was probably the most serious handicap, but despite the urgent need the very rigid standard of qualifications was lowered only very slightly, giving but little encouragement to prospective engineers. Since sufficient engineers were lacking in most shops, men who were needed to fill the current tasks were nominated to participate in an instruction course of four weeks duration. (This course covered many basic theories of welding engineering and practice.) The mental and physical tension of the pupils was very detrimental to the efficiency of these courses. Another method of making up for the lack of trained engineers was the transferring of one part of the duties and responsibilities from the welding engineers to skilled technicians or foremen. This

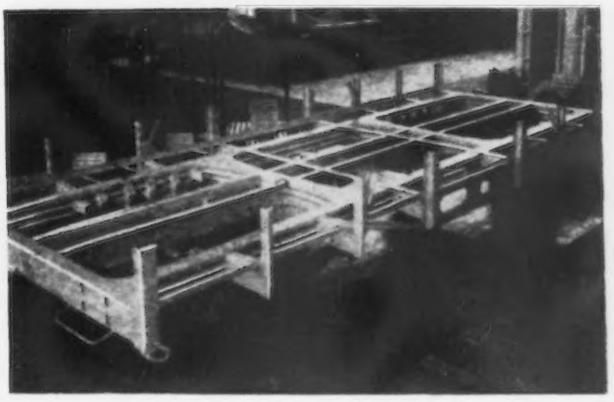


FIG. 5—Special high-strength gondola car underframe in which welded seams have draining aprons to carry off water from the bins.

gave only slight relief since these men had a very limited routine experience which usually pertained only to their respective jobs.

In addition to the difficulties of obtaining the required labor, the increasing lack of welding equipment, accessories, and electrodes made the situation worse. That problem was partially settled by a widespread use of multiple panel welders and automatic welding machines. In addition, development of a spotwelding machine with a rating of 600 spots per min was used advantageously.

During the war the German welding industry endeavored to develop welding technique towards the following:

(1) Increased efficiency
(2) Saving of skilled labor
(3) Saving alloys in parent materials and welding rods
(4) Increased use of air-refined steels
(5) Improved quality of welds

To further increase efficiency, joint preparation and simplification of welded parts was stressed. Automatic arcwelding machines of the Elin, Kjellberg, and Siemens manufacture were used. Further development of the Ellira welding, (Unionmelt) process was made, and considerable application was made in heavy industry. The Kaell-Ludin process, in which a coated electrode with two metal cores is welded by a three-phase current, was also tried. The improvement and increased use of flash-welding in the welding of rails, coupling bars and connecting rods of locomotives, and the crankshafts of armored vehicles, also increased production in wartime Germany. The above processes, as well as the developments in electrodes, will be discussed in a later article.

Hard-surfacing was used to a great extent as a means of saving alloy steels, not only in repairing, but also for producing new apparatus and tools.

The increased application of basic-bessemer steels for welding was necessitated by the war, because the

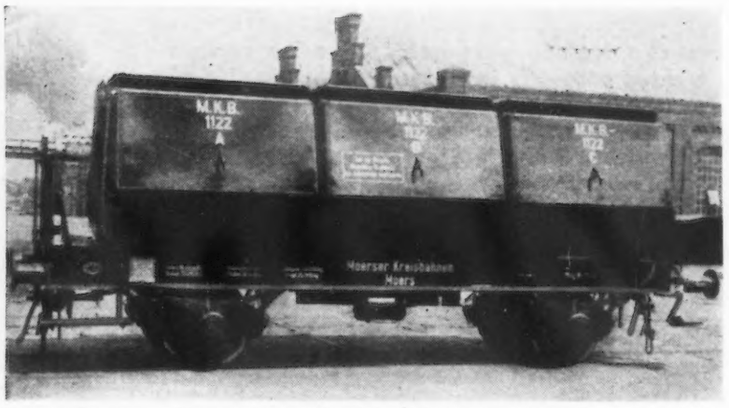


FIG. 6—German gondola car of all-steel welded construction.

demand for high-quality steels which could be produced only in electric, or openhearth furnaces, steadily increased. It was found that the usual basic-bessemer steels are more sensitive to welding cracks, especially in cold temperatures, than were openhearth steels. The use of air-refined steels was increased by limiting the phosphorus and nitrogen contents, or by killing the steel with aluminum and silicon.

For testing the quality of welds, nondestructive test methods such as X-rays and Magnaflux were used. With the exception of these, the testing methods using fluorescent and diffusing fluidities may be mentioned, but they were efficient only for detecting defects which were on the surface.

German Research Projects

One of the most important phases of German research was that involving the welding properties of high-tensile, low-alloy St. 52 steel (70,000 to 80,000 psi). This type of steel was used for economic reasons in place of St. 37 (50,000 to 55,000 psi), and gave much trouble because of cracking and breaking without any apparent cause. For many years research work by the best metallurgists was carried on in an effort to find means of improving the weldability of St. 52, but as far as can be learned, wholly satisfactory results were not obtained. Of its own volition, German industry exerted every effort towards the solving of this problem, and records indicate that the Nazi government attached a great deal of importance to it.

Stainless steels were developed in which nickel was replaced by chromium, manganese or other constituents. A great deal of research work was apparently done in an effort to determine the most advantageous composition of these steels for welding purposes.

In the field of brazing and soldering, both gas and electric, far more attention was given to the development of new solders containing very low percentages of tin and other scarce alloys than had even been given before the war.

In connection with the aircraft industry, a considerable amount of effort was devoted to the development of welding methods for aluminum and other light alloys. Spotwelding in particular was used to a very great extent, and with considerable success.

Vinidur and other thermoplastic materials were being tried in the construction of chemical equipment and machines. The method of welding these materials was only in the development stage, and very little data is available on this project.

In flame-hardening, some interesting research work, concentrating on best operating conditions was carried out. It was found that close control over operator technique was necessary to obtain optimum results.

Many German publications have devoted considerable space to the Unionmelt welding process, which is known in Germany under the name of "Ellira-Verfahren." Considerable use was made of this process, but the Germans never equalled the wide use of the Unionmelt process that exists in America.

The Elin Co. of Vienna, a well-known electric-welding equipment manufacturer in Europe, developed a new method of semiautomatic arcwelding in 1936, which they called the Elin-Hafergut process. This method, despite widespread publicity, made very slow progress and acceptance was not general.

The Kaell process introduced by the Kjellberg Co. (German division) was never more than a novelty. This process was invented in 1924 by Bethenod in France and was unsuccessfully put on the market by the Sodure Autogene Francaise.

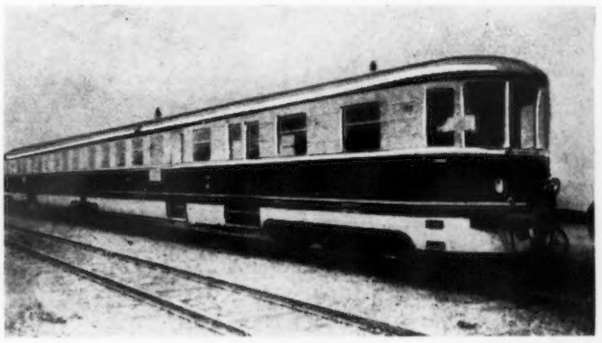


FIG. 7—Diesel-electric motor train of special light-weight welded construction. Powered by a 360 to 400-hp engine, the car will carry 143 passengers at a top speed of 50 mph.

The Aga, (oxyacetylene process) was a method whereby the principles of deep-fillet technique were applied. This was accomplished by better utilization of flame heat. The process found considerable use and was successful during the last years of the war.

None of the above methods proved outstandingly successful, however, outside of the Ellira process, which had fairly widespread use in ship-building, and in heavy industry.

German welding literature consists generally of three major parts:

(1) Research reports aiming to improve welding characteristics of many new metals, developed as substitutes for those which Germany lacked.
(2) Papers dealing with problems of increasing welding efficiency by improving known welding methods and developing new ones.
(3) Descriptions of welding applications in practice.

Automatic Welding Developments

The carbon circular-seam welding machine shown in fig. 1 uses a maximum current of 160 amp and carbon electrodes up to ⅜-in. diam. It is used chiefly

for operations on thin-wall material. The setting-up plate for the work can be regulated and its speed read by means of a scale attached to the machine. This enables the operator to make certain that the machine is working at the most efficient speed. The setting-up plate can be either horizontal or vertical. In the horizontal position, fig. 2, the welding head can be raised and lowered as required by the work. The holding block can be inserted in a slot provided for it. For welding work with several seams, the welding head can be adjusted to the various positions with a hand adjustment, fig. 3. The setting-up plate can be equipped with a magnetic feeder to economize on time in setting up. Power requirements do not necessitate the addition of a rectifier. As exact adjustment of the carbon electrode can be made, it is important that the carbon be slowly turned by hand so that uniform burning will take place. Even under the best conditions, burning will be uneven if the carbon is not turned. The carbon electrode is designed to permit the operator to see the work as he makes the hand adjustment. This would not be possible with a fully automatic movement of the carbon electrode on this type of arc welder. It was found that there has never been a demand in Germany for a fully automatic machine.

In preparing to weld the seam, the sheet metal is checked to make sure it has been cut straight and that it is properly fitted together. Failure to do this results in a weak weld. The current source is an ordinary transformer, with a range from 20 to 300 amp.

A study of comparative costs made in Germany on the above-described machine, is as follows: for 3 ft of seam welding on light sheet steel with welded flanges, the oxyacetylene process cost $2.00. Arcwelding, $1.60. Semiautomatic carbon welding, $0.15. The above figures were given by individuals who were in charge of machines of these various types.

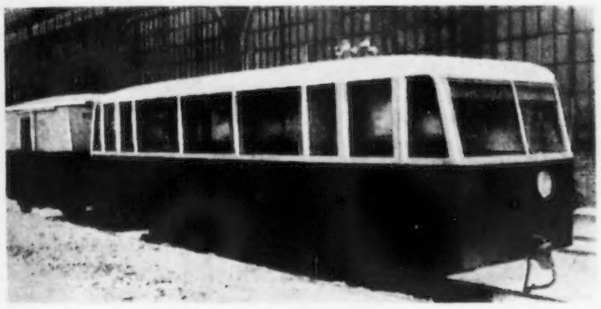


FIG. 8—Special light-weight rail omnibus. Powered by a 70-hp diesel engine, this four-wheel car weighs only 8 tons and carries 50 passengers, including 12 standees.

A hand-operated semiautomatic apparatus which was constructed by a manufacturer for his own use, and which proved to be well suited for welding with bare or coated electrodes by unskilled workers, was discovered in one plant.

As in the case of other automatic welding machines, the welding wire is fed by means of a friction-roll against which the wire is pressed by a spring roll. The friction roll is driven by a gear system consisting of two gears of approximately 4-in. diam, with 45 teeth, and two pinions approximately 1¾-in. diam, with 15 teeth, operated by a hand crank. The wire leaves the apparatus through a swinging nozzle. The number of revolutions of the hand crank is only 15 per min which enables the worker to operate the machine without too much physical strain.

It was found that approximately a half day of instruction was sufficient to train new workers. The rotating movement of the handle is easier to control than linear feeding of the wire in the normal hand welding method. A colored glass is fitted to the machine, through which the welding process can be observed. It was found necessary to insulate the whole machine. To direct the welding wire in the seam, it was found advisable to use some available piece of equipment, for example a small or large cutting torch, depending upon the size of electrode used.

The productive capacity of this hand-operated machine is almost equal to that of a fully-automatic electric machine. The quality of the work depends mainly on the watchfulness, and not so much on the technical skill of the operator. Wire waste of the hand operated machine amounted to about 6.6 pct. Compared to highly efficient automatic American types, this is extremely high; but during wartime, when equipment is difficult to obtain, it is beneficial for a manufacturer to improvise suitable devices whenever necessary. This welding machine serves as an outstanding example of German industrial resourcefulness.

The wheel flange welding process has been known for many years and is extensively used by the German railroads. Up to a few years ago, sets equipped with one or two welding heads were used, whereby both heads work on the same flange. The daily output of the machines with two heads was from 8 to 10 wheel-rims. In view of the stepped up requirements during the war, it was necessary to increase the capacity of these machines. This was achieved by simplifying the machine itself, as well as by increasing the number of welding heads to three. The advantages thus obtained are considerable and resulted in a great saving of time per unit. The daily output of the three-head type machine was approximately 25 units.

Welded Railroad Equipment

The first all-welded railroad car made in Germany was manufactured in 1928. It was a dump car having a capacity of 3530 cu ft. In the course of further development gondola cars were built which, by changing over to welded construction, could carry a

FIG. 9—All-steel welded box car with wooden floor inserts for securing the load. Twelve-wheel models were also produced with a capacity of 100 tons.

load 40 pct greater than the former design. The underframe, fig. 4, is designed as a supporting structure for the gondola. A special design securing high strength was also considered, and was found to be suitable for a gondola car, fig. 5. The weld seams have draining aprons by which water from the bins may quickly drain off and prevent corrosion of the structure. Fig. 6 is an example of such a car.

The welded passenger coach was introduced with the construction of welded express train coaches. The development of this coach was as follows:

1900	Wood coach	75 tons
1910	Wood coach with steel girders	55 tons
1926	Riveted coach	48 tons
1932	All-welded coach	35 tons
1938	All-welded coach	28 tons

Parallel with the development of the passenger coach, was the development of the rail motor coach

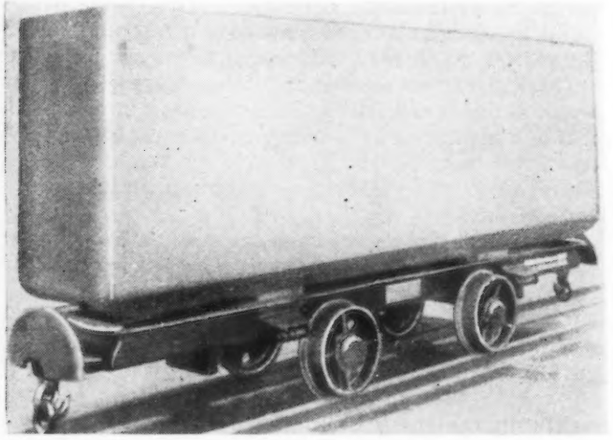


FIG. 10—German mine tub which owes its light weight and efficiency to all-welded construction.

or "rail car." The development of a rail motor coach was recommended by the German railroads in order to meet the requirements of the less frequented secondary lines. To this end a rail motor coach was developed, and in addition to it, a trailer coach of the same design, but without a motor.

Following a design of Crosseck, a rail motor train was developed of monocoupe type having light construction which was made possible by the use of welding, fig. 7. An ultra-light vehicle is a four-wheeled rail car having a dead weight of only 8 tons, fig. 8. The development of passenger coaches in Germany was discontinued on the outbreak of the war.

The box car also has pushed its way through from wood construction to welded steel design. Fig. 9 shows an all-welded box car with only a few wood inserts in the floor, to allow fastening of the load. The latest design was a box car, equipped with axles for an axle-pressure of 30 tons. For heavy loads a 12-wheeled car had been designed, of welded construction, able to carry approximately 100 tons of net load.

A special problem in rail transportation is the transport of fuels. Previously it was usual to construct a car with a built-up tank. As the tank represents a structure having a high degree of strength, it was made use of in German rail design as a supporting member, and in this way a tank car was built having no underframe, thus making possible greater utilization of the section and giving highest efficiency loading. Both four and eight-wheeled tank cars were developed along these lines, and only a plate girder is provided to meet the buffer action.

Another field of application related thereto may be mentioned, which is the mine tub, an important rail car which is built especially light and efficient by the application of all-welded construction, fig. 10.

German car manufacturers have built the cars indicated above with a high degree of success. Each manufacturer managed to engage a minimum staff of experts so that welding technique could be controlled and make safe progress. As a rule, the training of welders was accomplished in each manufacturer's training shops. Apart from details the training schedules were basically the same.

The electrodes used in railroad construction were developed by electrode firms based on practical requirements. Welding was done almost entirely with heavily coated electrodes. Difficulties came up in the last years of the war, caused by the repeated redesign of the electrode covering, in connection with the poor quality of steels to be welded. These difficulties were not found to be insurmountable, and electrodes were developed that proved generally successful with the various types of steel used.

The structural steel used formerly was a steel having a minimum tensile strength of 45,000 psi. In most cases this is openhearth steel. To meet the demand for light-weight construction, new steels were developed having a tensile strength of 74,000 psi. This type steel was used very extensively during the latter part of the war.

The general technique of welding used in rail-car construction is fundamentally the same as the known accepted methods in America. Oxyacetylene welding is used for only approximately 2 pct of the work. The electric arc is the principal method employed. Labor-saving devices, partly straight-line production, as well as assembly-line production in some plants, and ample use of the breakdown of constructional process into unit fabrication, were definite assets in increasing the efficiency of the work done, and in improving quality of the products. Fundamentally, the welding sequence is accomplished by carrying all welding towards the free ends and welding as much as possible in an unrestricted manner. Electric flash-welding is used, particularly on brake triangle shafts and on draw-bars. In this field also, new designs have originated which lowered the weight of approximately 80 lb of solid construction, to 45 lb of arc welded hollow girder construction. Spot welding is employed in few rail-car manufacturing plants. Automatic welding and other welding methods were used to only a slight extent, in the rail manufacturing industry of wartime Germany.

** The opinions and findings expressed in this article are the private findings and opinions of the author, and are not to be construed as the official opinions of the U. S. Army.—Ed.*

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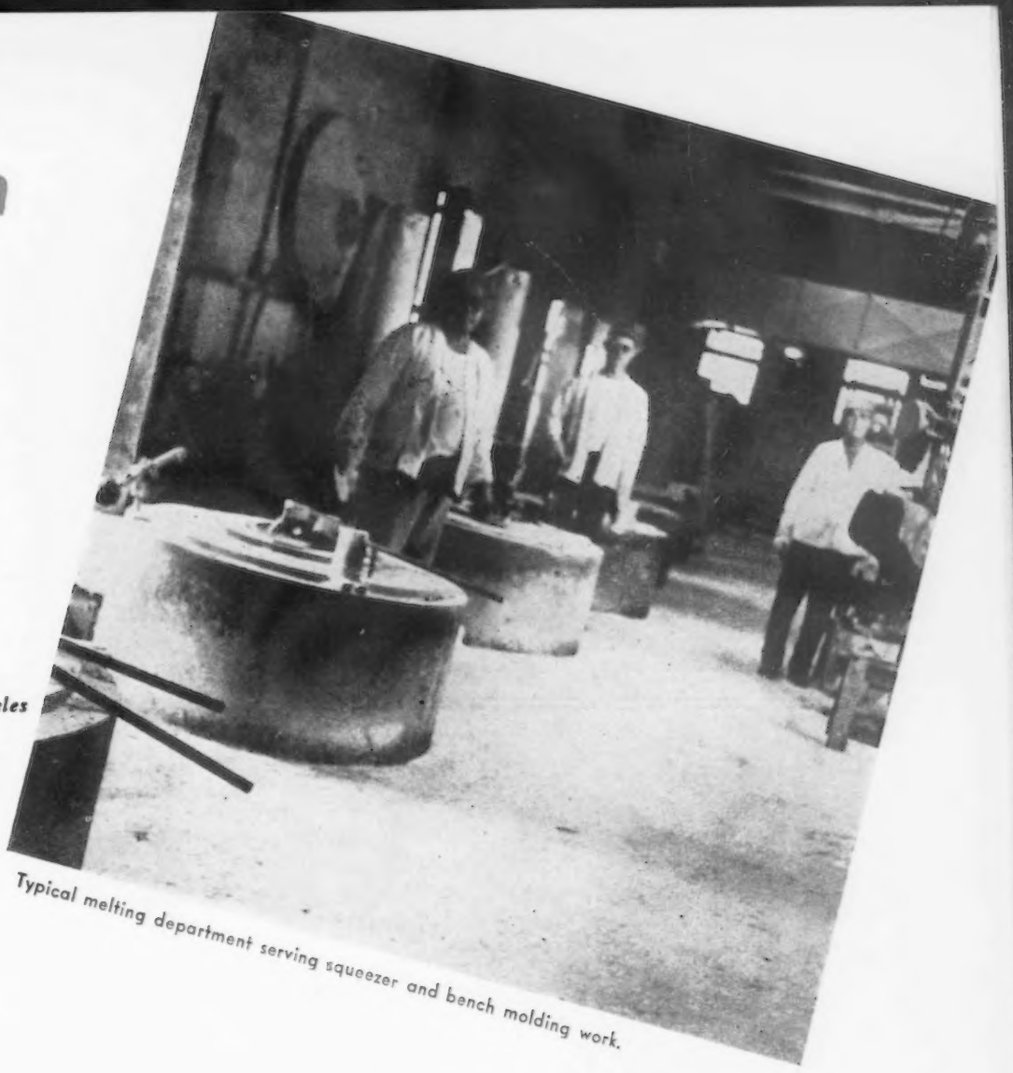
Magnesium Melting Practice

By LEROY M. NASH
Magnesium Alloy Products Co., Los Angeles



Typical melting department serving squeezer and bench molding work.

Current magnesium melting practice, as improved by war-spurred research, is reviewed here, with particular reference to the effect of crucible material and scrap condition on the purity of the cast metal. Condensed from a paper presented before the Southern California chapter, AFA.

WITH large numbers of magnesium foundries revamping their foundry practices to accommodate new peacetime products, this review of general melting practices may assist in solving some of the reconversion problems.

The three most popular methods of melting magnesium are: (1) The wet-flux method for refining and casting; (2) the crucible method for sand and large permanent molds; and (3) the sulfur atmosphere method employed for low-temperature work such as diecasting.

The wet-flux method is now used primarily for alloying and refining and as a holding furnace for crucible melting. This process involves the use of a flux composed chiefly of magnesium and sodium chloride, which is very fluid and melts several hundred degrees below the melting point of magnesium alloys.

A melt, using this method, consists of about one-third flux, most of which stays at the bottom of the pot, while just a thin film forms over the top of the metal and down the sides of the pot. Pouring is usually by means of a bottom-pour hand ladle.

The flux is swept from the top of the pot by means of a lip on the side of the ladle. Once a ladle full is removed, the flux again covers the molten metal, keeping it completely protected from the atmosphere. Since the flux can be stirred thoroughly through the metal, it performs a very efficient job of removing dirt and oxides.

Since the presence of oil and paint will rapidly destroy the efficiency of the flux, it is often more economical to remove excesses of these impurities before melting. However, very dirty and badly oxidized scrap can be put back in first class condition by this process.

This melting technique was developed in this country by Dow Chemical Co., and was the chief process in use until about 1937. Due to the large amount of flux used and the design of the pot, roughly half a sphere, this process appears to be the most efficient yet developed for cleaning and refining magnesium.

The greatest drawback to the wet-flux method is that unless extreme care is exercised, it is an easy matter to dip flux out of the pot with the metal and thus leave traces of flux in the castings poured. Wet-fluxing is finding especially effective applications in production foundries where the molds can be conveyed to the furnaces, but it is difficult to apply to the jobbing shop lacking means of transporting or pouring more metal than can be carried in a hand ladle.

FIG. 1—Clean scrap is essential for producing sound magnesium castings.

Crucible Melting Method

The crucible melting process is now the most commonly used melting method since almost any amount of metal can be prepared and poured. This process was first developed in Germany but, due to patent and development difficulties, did not receive much consideration in this country until 1935.

The crucible process is a batch-type method somewhat similar to that used in brass where the metal is melted and poured from the same crucible. One of the advantages of the crucible method is that it permits using less flux.

Magnesium is melted, when this process is employed, in a welded steel crucible. Since this practice results in a slight iron pick up which lowers the corrosion resistance of the magnesium, steel crucibles are not the perfect melting medium. However, other types of crucibles are bonded with clays containing silicon which will also alloy with the magnesium. The only exception to this is the Tercod crucible and present investigations of this material indicate it has interesting possibilities.

When melting metal directly in a crucible, the first point of potential trouble is the condition of the scrap. All scrap should be sandblasted to remove as much as possible of the surface oxide and dirt, as shown in fig. 1. Scrap that cannot be properly cleaned should be separated and melted by the wet-flux method and poured into ingots for future use, or discarded altogether.

All traces of sand must be removed from scrap, regardless of the melting medium used. Magnesium alloys quite readily with silicon from the sand, and a relatively small amount of silicon produces brittleness and interferes with proper heat treatment.

Care must be taken during melting to keep the metal covered with flux as it melts down. Oxides produced in melting increase the time and labor necessary to clean the metal later.

One form of crucible melting practice consists of a double fluxing operation, using a relatively wet flux first to clean the metal, with a dryer flux being used later for protection. This procedure has merits for cleaning dirty metal, but it increases the possibility of flux inclusions if too much wet flux is used.

Stirring of the melt appears to give best results at from 1350° to 1425° F, but this temperature is not too critical. Practically, the range noted is about as high as one can go and avoid excessive oxidation during the stirring.

Stirring is accomplished with an iron rod long enough to reach the bottom of the pot, and preferably square, and should be accompanied by an occasional sprinkling of flux to keep a flux cover on the surface of the metal. This stirring phase requires from one

FIG. 2—Skimming the dross off the metal after the stirring operation.

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to five minutes, depending upon how careful the melter has been up to this point. If this operation is improperly performed, the metal surface when skimmed will appear pimply from the presence of small oxide particles floating near the surface.

The mechanics of the stirring operation appear to be twofold. First, the flux is stirred into the melt where it can come in contact with the dirt and oxide particles. When these particles become coated with flux they no longer hang in suspension in the melt,

but sink to the bottom or rise to the top depending upon their specific gravity. The second effect is that of the centrifugal force set up by the rotary motion forcing some of the heavier particles to the crucible wall where they cling to the flux left on the wall during the melting. The lighter particles move toward the center where they are trapped in the flux added in stirring and then rise to the surface when stirring stops.

When the stirring operation has been completed, the material accumulated on the surface is removed with a skimmer and a new light dusting of flux is added, fig. 2. Stirring should not take over 3 to 4 min and consequently it is not usually necessary to interrupt the heating of the melt.

The next step is to heat the melt to at least 1600° F, for not less than 20 min, or as high as 1700° F for approximately 10 min. This superheating procedure produces a finer grain size in the melt and since grain size and strength are related it is desirable to produce as fine a grain as possible.

Following the superheating, the metal should be held at not less than 1450° F until it is ready to pour. Then the metal should be cooled as quickly as possible to pouring temperature. This procedure is necessary for the effect of superheating is quite readily lost if the metal is held for any period of time at a lower temperature.

To prevent flux inclusions, no flux should be added to the melt for at least 10 min. previous to pouring. The flux, when first added, is just slightly wet and in this state can easily flow with the metal into the mold. After a few minutes' heating it becomes thick and sticky and will cling to the crucible.

When the flux on the surface of the melt is exposed to the air, a hard crust is formed. This crust provides a perfect protection for the metal and can be removed or pushed away just before pouring. From this point until pouring is completed, only the dusting agent should be used to prevent burning of the metal.

Accumulations of flux on the pouring lip, rim and ears of the crucible should be brushed off before pouring, as shown in fig. 3. The total amount of flux necessary to complete the melting operation should not exceed 2 to 3 pct by weight of the metal melted.

Normally magnesium dissolves very little gas and it is only quite recently that it was found that it does dissolve hydrogen. Considerable study has been devoted to this subject over the past three years, for the presence of gas in the metal has a very pronounced effect on porosity, especially in heavy sections.

Much of the gas found in magnesium derives from moisture. A humid atmosphere is known to produce some. This makes it essential that all materials used in melting should be as dry as possible. Scrap ingot and tools should be preheated, even though they appear dry.

The most difficult material to keep properly dry is the flux. Since it is largely composed of chlorides, it can contain enough moisture to cause gas trouble without appearing to be even damp.

Considerable research has been undertaken on methods of gas removal and more positive means of grain refinement. A number of materials, such as some of the alkaline earths and some of the carbides and graphite, do give results when added to the melt, but thus far none has proved to give consistent results.

Considerable promise is indicated for chlorine gas bubbled through carbontetrachloride and then passed through the melt. When this arrangement is used in conjunction with a Tercod crucible, it has proved capable of cleaning, degasing and grain refining all in one operation. However, many aspects of chlorine use have yet to be investigated and as both chemicals are toxic and corrosive, their handling by the average person is somewhat dangerous.

The other three melting procedures discussed previously will give good results so that until the chlorine method has been more thoroughly developed it is not advisable to use it in the average foundry.

As an important safety step, crucibles should be gone over between heats with a ball peen hammer, to ascertain that there are no thin spots or cracked welds. A small leak of magnesium produces such an intense heat that it will burn the whole bottom out of the crucible very rapidly and a bad fire may result.

All furnaces should be kept clean, for the iron scale from the crucible produces a thermite reaction with magnesium and can result in a very violent explosive reaction.

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FIG. 3—Brushing loose flux and scale from the crucible lip before pouring.

German vs. American Cemented

TABLE I

German Steel-Cutting Grades

Grade Designation, Symbol	Transverse Rupture, Kg per Sq MM	Equivalent in Psi	Equivalent on Standard Blanks, Kg to Break	Ra Hardness	Tool Value Computed	Notes
S1	125	177,900	1430	91	92	78 WC, 16 TiC, 6 Co
S2	140	199,220	1526	90.5	94	78 WC, 14 TiC, 8 Co
S3	150	213,500	1720	90.0	101	88 WC, 5 TiC, 7 Co

TABLE II

Steel-Cutting Grades of One American Manufacturer

Grade Designation, Symbol	Transverse Rupture, Kg per Sq MM	Equivalent in Psi	Equivalent on Standard Blanks, Kg to Break	Ra Hardness	Tool Value Computed	Notes
K4H	157	225,000	1720	92.3	122	Having $WTiC_2$ as an ingredient
K3H	183	260,000	2090	92.0	179	Greatest percentage of $WTiC_2$
KM	214	305,000	2460	91.0	159	Having medium content of $WTiC_2$
K2S	214	305,000	2460	91.5	164	Having $WTiC_2$ as an ingredient

TABLE III

German Cast-Iron Cutting Grades

Grade Designation, Symbol	Transverse Rupture, Kg per Sq MM	Equivalent in Psi	Equivalent on Standard Blanks, Kg to Break	Ra Hardness	Tool Value Computed	Notes
G1	160	227,680	1830	90.0	108	94 pct WC, 6 pct Co
G2	180	256,000	2060	88.5	101	89 pct WC, 11 pct Co
G3	205	291,715	2350	87.0	96	85 pct WC, 15 pct Co
H1	160	227,680	1840	91.0	118	94 pct WC, 6 pct Co (Doubtless selected grain size)

TABLE IV

Cast-Iron Cutting Grades of One American Manufacturer

Grade Designation, Symbol	Transverse Rupture, Kg per Sq MM	Equivalent in Psi	Equivalent on Standard Blanks, Kg to Break	Ra Hardness	Tool Value Computed	Notes
K6	157	225,000	1800	92.2	125	WC and Co with grain-size control
K12	246	350,000	2800	89	147	WC and Co with grain-size control

To convert kg per sq mm to psi: multiply by 1423. Kg of load to break standard piece x 124=Psi: transverse rupture.

Carbides

By PHILIP M. McKENNA
President, Kennametal, Inc., Latrobe, Pa

In interpreting the physical properties of the German cemented carbides contained in the article by Gregory Comstock (THE IRON AGE, Aug. 30, 1945), the author is brought to the conclusion that the cemented carbide industry in Germany made no material progress during the years of Nazi rule. This is shown in comparative microstructures and physical properties of the German and American cemented carbides.

AN article appearing in THE IRON AGE of Aug. 30, 1945, entitled "German Cemented-Carbide Industry," by Gregory Comstock, gave the American cemented-carbide industry a view at what the enemy's way of developing things in this industry had produced. Apparently under Nazi rule fundamental progress had stopped, because the cemented-carbide products disclosed are in the same stage of development as they had been 10 yr ago in the United States.

As to capacity, it can be said that the rated capacity of the main Krupp plant at Essen was less than that produced monthly by an independent American manufacturer at Latrobe, Pa., who in 1938 started business with fewer than 12 employees, in a storage garage, to carry out an invention in steel-cutting cemented-carbide tools. The capacity of the main Krupp plant is given by Comstock as 15,000 kg (33,000 lb) a month, whereas this one manufacturer, not in existence in 1937, provided America and its allies with over 18,000 kg (39,600 lb) a month during the war months of 1945. Total German capacity in ten plants was 79,500 kg (174,900 lb) per month.

More notable is the comparison of quality of the product American invention and technique, and the German product especially in the more important field of application of metal-cutting carbide tools, namely in cutting steel, that almost universal metal for constructing machines and armament.

For purposes of comparison, an empirical formula for evaluating cemented-carbide tool compositions has been useful when considering compositions of hard-carbide particles cemented with cobalt. This formula provides a rough measure of the quality of such tool materials by combining into a single figure the Rockwell hardness on the A scale and the transverse rupture strength of a piece 0.200 in. thick x ⅜ in. wide broken between 9/16 in. centers and measured in kg. It cannot, of course, put into figures the qualities of resistance to cratering, the temperature of accelerating failure and other pertinent properties. Nor does it measure proportionately the pieces of work turned out per regrind of the tool, because a composition sufficiently strong for a certain job is not necessarily improved by being stronger. In some cases however ten times as much work can be done with a cemented-carbide tool which is 30 pct stronger than another.

A margin of strength above that required to cut the workpiece at the depth and feed required is surprisingly effective in increasing the daily output of a machine shop by avoiding tool breakdown and resetting of replacement tools. This is so because a number of unexpected factors are encountered in practical machining operations, putting temporarily greater strain on the tool edge. Some of these are due to hard spots in steel castings and forgings being machined, irregular surfaces requiring momentarily heavier cutting; and irregular motion or "chatter" in machines. Then the stronger cemented carbide shows up to advantage in larger daily output despite a weaker tool being able to do the same work under the same average but uniform test conditions.

$$\text{Tool value} = \frac{10 \times \text{break strength in kg}}{\dfrac{5(93\text{-R a})\ (47\text{-R a}) + 140}{2}}$$

It was established so that the tool-value figure for compositions acceptable and used 10 yr ago had a value of approximately par, or 100. For instance, a straight-tungsten carbide composition sintered with about 2 pct of cobalt binder might have a hardness of 93 R a and to be satisfactory should have a break strength of 1400 kg. Putting these figures in the above formula there results 14,000 for the numerator, and inasmuch as 93 minus 93 is zero the whole denominator comes to merely 140, and the tool value is 100. Taking a softer composition, much higher in cobalt, the combination of Rockwell hardness 87A calls for a break strength of 2450 to bring the combined tool value to par. Applying this simple test to German and to American compositions, the German figures being those reported by Comstock, the tables shown on the opposite page are obtained.

The following chemical analysis of two German ce-

mented carbides shows that they were examples of grade G1 and S1 reported in Comstock's article:

	G1 (round shank) Pct	S1 (rectangular shank) Pct
W	87.07	74.58
Ti	0.30	12.60
Co	6.90	6.40
C	6.05	6.10
Fe	0.25	0.50
Ni	0.35	0.10
Mo (spectro)	high trace	high trace
Cb (spectro)	trace	trace
Ta (spectro)	low trace	low trace
V (spectro)	low trace	low trace
Si (spectro)	trace	trace
Mn (spectro)	trace	trace
Mg (spectro)	trace	trace
Cu (spectro)	trace	trace
Ca (spectro)	trace	trace
Cr (spectro)	trace	trace
Al (spectro)	trace	absent
Na (spectro)	trace	absent

The analyses indicate that these are grades G1 and S1 respectively of the German carbide industry as reported by Comstock, except that the cobalt contents are in both cases about 1 pct higher than those given. The 30 pct Ti in the G1 grade indicates lack of careful handling of mixes.

The X-ray diffraction analysis shows nothing unusual as to the major constituents but some impurity patterns were found. Fe_3N is positively present and TiO_2 and $MoSi_2$ are indicated.

Microphotographs, figs. 1 to 4 inclusive, show what would be considered bad structure by American standards, particularly in the G1 grade. There are large grains, nonuniformity and voids of considerable size in both German specimens.

For purposes of comparison microphotographs of

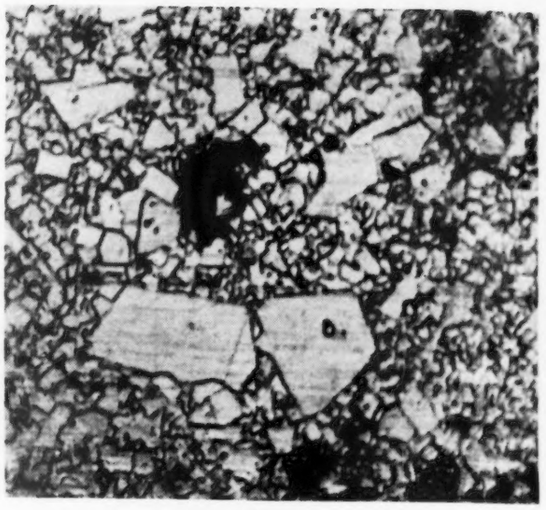
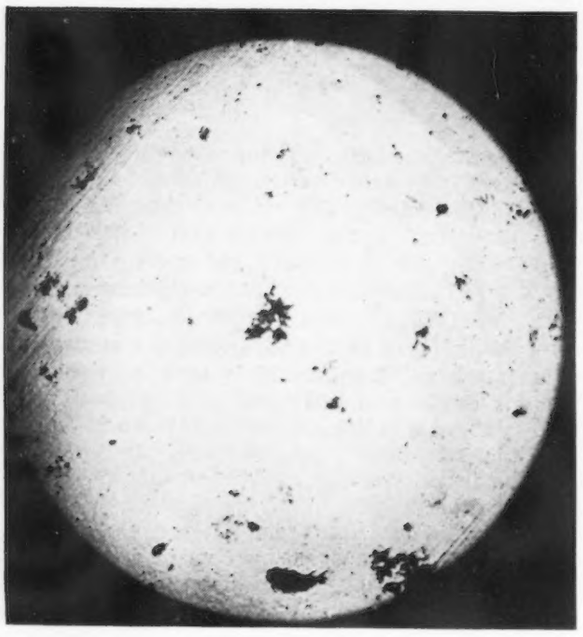


FIG. 2—Photomicrograph of the German round-shank tool tip after a standard etch, at 1500 X. The heterogeneity of the WC particle size and segregation of the WC (light) and Co-rich (dark) phases are apparent.

BELOW

FIG. 1—This area from a German round-shank tool tip shows considerable porosity, varying in size from pin point to cavities of appreciable dimensions. The segregation near the center of the field appears to be a skeleton of the WC-rich phase. Such large, irregular segregations are readily pulled from the much softer matrix during polishing. The cavity in the lower part of the field still shows the skeleton outline of the segregation. The other large cavities shown here were probably produced in a similar manner. Unetched, at 400 X.



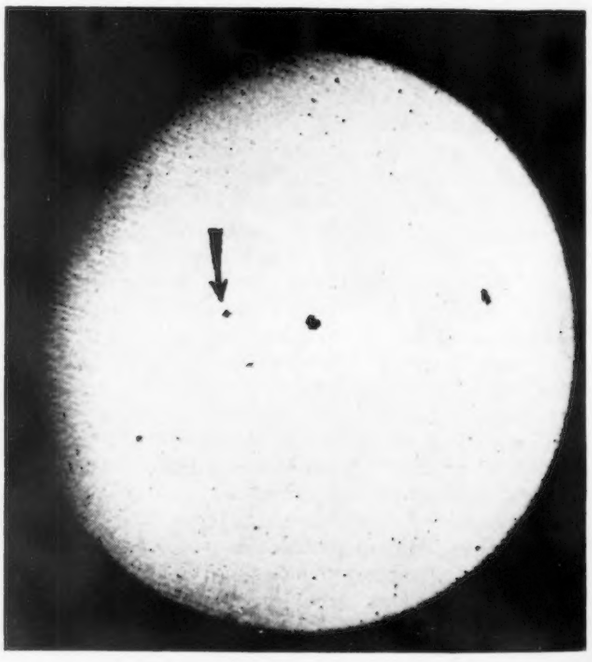


FIG. 3—Microstructure of the German rectangular-shank tool tip reveals fine pin-point porosity. The larger, dark angular cavity near the center appears to have been produced by pulling out such a polyhedral constituent as indicated by the arrow. This tip is sounder than the round shank tool tip. Unetched, at 400 X.

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American products, KM, K3H and K6, are also shown, figs. 5, 6 and 7.

That German workshops did not always follow one of the simplest rules in grinding carbide tools is shown by the concave grind on the clearance faces, the tools having been ground on the periphery of a wheel instead of on a cup wheel, or on the flat side of a wheel, thus producing a straight clearance.

A delegation of members of the National Machine Tool Builders Association have returned from Germany and are reported to have said that there were as many machine tools in Germany today, in reparable condition, as there are in the whole United States. Yet they point out that American industry produced three or four times as great an output of arms and munitions, and the question is raised as to how was this possible. Certainly one of the obvious answers is that the possession of cemented hard-carbide tools having 30 to 50 pct higher break-strength in America was a chief reason. This is because the higher resistance to breakage of American steel-cutting carbide tools permitted feeds per revolution three to four times those possible with German grades for steel cutting. Reports of German machine shop practices for some years have been that very light feeds were the practice on steel cutting with carbide making a lot of "hay," as the shop man says. Fig. 8 shows chips taken with the high strength American steel-cutting carbide indicates attainment of rapid metal removal by high strength of steel-cutting carbide.

Another indication of this is that in Germany carbide steel milling, if attempted at all, was restricted to very light cuts with low feed per tooth. Fig. 9 showing the rapidly developing art of milling steel with high-strength solid carbide blades at high chip loads, from 0.005 in. to 0.020 in. advance per tooth, at depths up to ½ in. on high-strength steels, illustrates American practice.

Records of shell production show that it is a conservative statement to say that 1 gm of steel-cutting cemented carbide having 50 pct higher break strength when of equal hardness turns out 4.3 times as many shells as cemented carbides of the German characteristics.

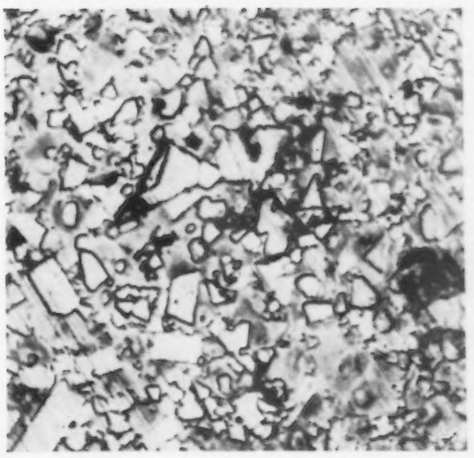
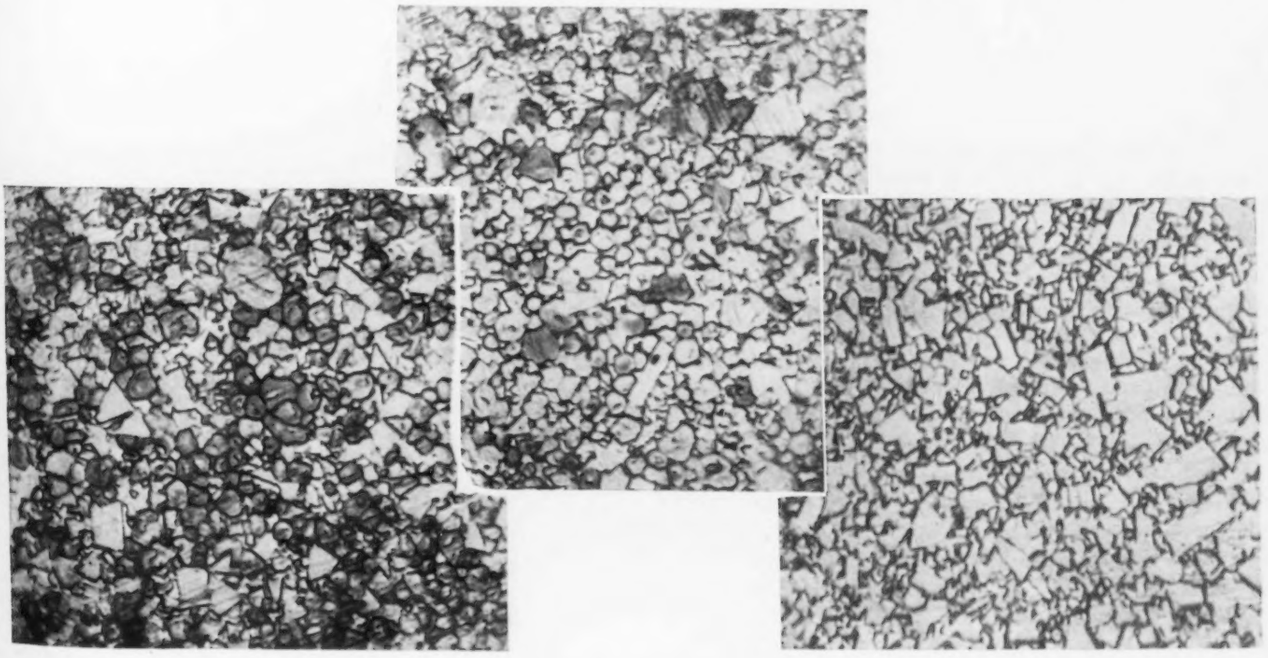


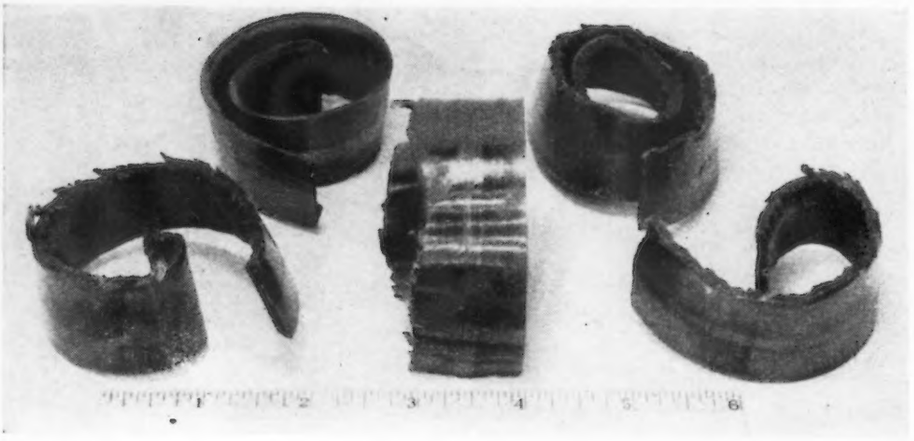
FIG. 4—Etched area of the rectangular-shank tool tip at 1500 X. It can be seen that the WC and TiC-rich particles are more uniform in size. It is also apparent that the segregation is less severe in the TiC bearing tip than in the WC-Co tip which contains only a small addition of TiC.

So far as is known, Germany did not produce cemented-carbide files suitable for lathe work on removing burrs from steel and this may well be because of the lack of the strength necessary, in combination with hardness, required for file teeth to stand up. Fig. 10 shows such an American file, which came into use only at the last stages of the war.

While victory is fresh in our minds, it is the author's firm belief that the record should be straight, as it seems terribly important in future decisions of our country. The facts as are known in this one phase of development, cemented-carbide tool metal, a very important one in industry, is that under totalitarian

FIGS. 5, 6 and 7—For purposes of comparison, microstructures of American products are shown here. Fig. 7 is KM; fig. 8, K3H and fig. 9, K6. All have been given a standard etch and are shown at 1500 X.





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LEFT

FIG. 8—Chips from a 25-in. diam rotor forging. Roughing cut was 0.075 in., feed was 110 ft per min with 1 in. maximum depth. Cut was taken with a 2-in. square KM grade clamped on tool. These chips indicate the attainment of rapid metal removal by high strength steel cutting carbide.

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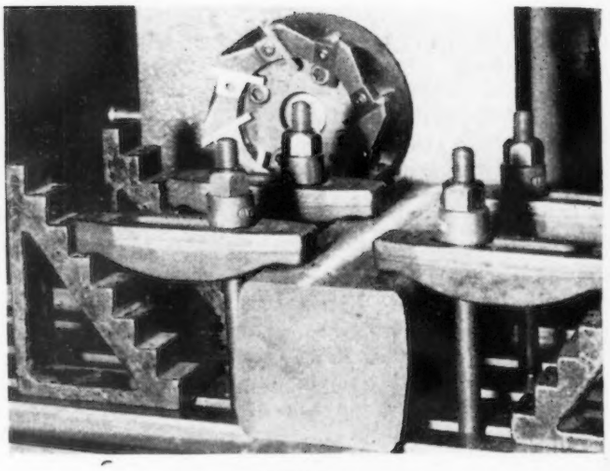

ABOVE

FIG. 9—Shown here is the use of high strength solid carbide blades in milling cutters. The cutter used here for milling stainless steel is an 8-in., 8-tooth face mill with KM blades. The high chip loads, from 0.005 in. to 0.020 in. advance per tooth, at depths up to 1/2 in. on high-strength steel illustrate American practice.

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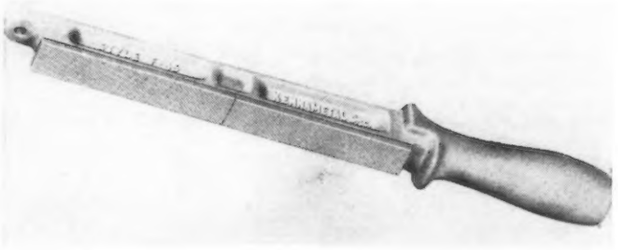

BELOW

FIG. 10—This American cemented-carbide file did not come into use until the last stages of the war. Thus far there has been no indication that Germany used cemented-carbide files, suitable for lathe work in removing burrs from steel. It is very likely that lack of the necessary strength in German cemented carbides prevented this application.

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government in Germany progress did not take place during the past 10 yr as it did in America. Slaves or rigidly-controlled persons without incentives do not innovate industrial processes, or make inventions, and certainly lack the power necessary to take risks to initiate commercial exploits. It is often the case that dictatorships have called upon the services of American engineers, nurtured on the work habits of a country having constitutional freedom, to create those values which are impossible in the dictatorship because if they exist in the controlled population, in the talents of the people, they are stifled at the inception. This is inherent in controlled industry, that the decision to try new things must be passed upon by some agency of the government. It is generally the case that the greater, and more revolutionary an idea may be, the less likely it is to meet with the approval of "prudent" men. America needs competition and risk taking, and the only way to ensure these is to make secure the fruits of such initiative to the innovator. This is done under the Constitution of the United States.

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The Welding of Nickel-Alloy Steels

In the first two sections of this four-part article, the author discussed the metal-arc process of welding nickel-alloy steels from the viewpoint of weldability, hardenability, evaluating steels for welding and the selection of welding electrodes. He now deals with the intricacies of structural welding and the fabrication of pressure vessels by welding, and presents test data governing selection of steels for these purposes. Fatigue strength of arc-welded joints is also considered.

By T. N. ARMSTRONG

Development & Research Division, International Nickel Co., Inc.

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EACH welding process has certain advantages but because of its overall economy and flexibility metal arc welding is most often applied for structural welding. The largest percentage of metal arc welding is done manually although the use of automatic welding has increased rapidly in recent years as it economical for welding long seams in the flat position and the quality of the weld is not affected by the human element. In automatic welding either a covered electrode in a continuous coil is used and the coating slit for feeding the current to the core wire or a granular flux is strewn along the joint and bare wire of suitable analysis used in making the weld.

One automatic welding method that has come into wide use is the Unionmelt process in which the joint is filled with a granular flux and bare wire fed through the flux to make the weld. Very heavy current density is used and welds are usually completed by making one pass from each side. A much larger portion of the base metal is melted than with manual welding. Consequently there is more dilution of the weld metal. Where special properties are required welding wire of composition approaching that of the base should be used.

By proper application of preheat and by stress relief anneal before the weld cools, steels of high hardenability are currently welded on a production basis. Such steels as SAE 4340 are satisfactorily welded by preheating to 400°F, maintaining the preheat temperature during the welding operation and stress relief annealing immediately after completing the weld. Preheat temperatures above 400° to 500°F have not resulted in any advantages in welding the low alloy constructional steels and in some instances too high preheat temperature may result in lower mechanical properties.

Although the oil-hardening steels such as SAE 4340, 8640, 4140, 3140, etc., can be welded successfully, it is much easier to weld such steels when they contain 0.30 pct carbon or less. For parts such as are used in landing gears and other highly stressed members of aircraft the 0.40 pct carbon grades are necessary to meet the high strength requirements. Also there are numerous cases where the 0.40 pct carbon alloy steels may be salvaged by repair welding.

When welding the direct-hardening nickel-alloy steels of high hardenability such as SAE 4340 a welding procedure must be worked out for each job. If the assembly is to be heat treated after welding, an electrode must be selected that will respond similarly to the base material on quenching. The advisability of using a backing strip, the optimum size of electrode and the welding sequence are factors that vary with each job and can be determined by past experience and by trial.

Welding Aircraft Tubing—Mechanical tubing of NE 8630 steel was developed during the war as a substitute for a conventional SAE steel. Many investigations were conducted by government organizations, steel companies, tubing producers and aircraft builders. The results of many reports[10] indicated that most SAE 4130 chromium-molybdenum steel carried some residual nickel, consequently the hardenability of NE 8630 was somewhat less, but in the thin sections used in aircraft tubing the difference was not marked. The advantages of NE 8630 were that because of low chromium content less time was required for solution of chromium carbides. NE 8630 was also reported to be less susceptible to cracking and could tolerate higher carbon content than the steel it replaced. The hardness gradients across the weld were often less steep than in the steel formerly used.

Low Alloy, High-Tensile Steels—With the wide acceptance of welding as an approved method of construction a group of steels was developed that have moderately high strength, high elastic limit, resistance to corrosion in marine and industrial atmospheres and possess welding qualities about equal to those of mild structural steel. The properties are obtained by careful adjustment of several alloys, one of which generally is copper, in such a manner that severe heat treatment is not required to put them in condition for use. The particular advantage in the use of these steels is reduction in weight in material necessary to accomplish a given purpose in structural engineering. These steels, usually marketed under proprietary trade names, have been used

in lightweight freight and passenger cars, tank trucks and truck bodies and frames, power shovels, overhead cranes, locks in inland waterways, barges, gun mounts and many other applications.

The nickel-copper steels have been the most popular of this class as they form about as readily as mild-structural steel and have unusually good welding properties. Because of their limited hardening capacity they are welded without preheat and for most types of construction, it is not necessary to stress relief anneal.

There are a number of different nickel-copper steels available all of which are sold on a guaranteed minimum yield point of 50,000 psi. Tensile strengths usually exceed 70,000 psi and elongation in 2 in. approximately 22.0 pct or over. Most of these steels will fall within the following range of analyses:

Pct C	Pct Mn	Pct Si	Pct P	Pct Ni	Pct Cu	Pct Cr	Pct Mo
0.12 max	0.10 to 1.00	0.05 to 0.25	0.04 to 0.15	0.45 to 2.25	0.30 to 1.25	0.40 to 1.00	0 to 0.15

One series of tests was made on welded plate of 2 pct nickel, 1 pct copper steels of two different carbon levels. Presumably the plate was ½ in. thick. Specimens were cut across the weld and tested in tension. With the following plate compositions, properties of the welds after different treatments were as shown in table IX.[11]

Steel	Pct C	Pct Ni	Pct Cu
A	0.08	1.99	1.02
B	0.22	1.98	0.92

The decided increase in strength properties after the 950°F treatment is due to precipitation hardening, a characteristic of all steels containing appreciable percentages of copper. Although increase in strength is accompanied by some loss in ductility the low-carbon grades retain sufficient toughness to meet most requirements.

The following results were secured from testing another type of nickel-copper steel after welding. Butt-welded joints were made with low-alloy steel electrodes and specimens were taken normal to the direction of welding. Analysis of the plate was within the following range:

Pct C	Pct Mn	Pct Si	Pct P	Pct Ni	Pct Cu
0.08 to 0.10	0.55 to 0.65	0.03 to 0.08	0.11 to 0.13	0.55 to 0.75	0.95 to 1.15

Properties of the specimens as welded, for different plate thicknesses, are shown in table X.

Welded plates ⅜x½ in. thick of the same steel after stress relief anneal at 1040°F for 3 hr gave results within the following range:

Thickness of Plate, In.	Yield Strength, Psi	Tensile Strength, Psi	Pct Elongation, (2 In.) Free Bend
⅜	55,000 to 62,000	75,000 to 83,000	36.5 min.
½	56,000 to 64,000	81,000 to 83,000	29.0 min.

Another type of nickel-copper steel that is widely used contains molybdenum. Although made with a maximum of 0.12 pct carbon to meet 50,000 psi yield strength in thickness up to ½ in. a higher carbon grade is also available for heavier sections and for higher strength in the lighter gages. Average values of five tests in the as-welded condition are shown below:

Pct C	Pct Mn	Pct Ni	Pct Cu	Pct Mo	Yield Strength, Psi	Tensile Strength, Psi	Elongation (2 In.), Pct
0.23	0.71	1.25	1.30	0.17	78,000	94,500	24.0

All of the different types of nickel-copper steels have not been included in this section but experience has indicated that these steels have similar welding characteristics providing carbon and manganese are within the same limits. Some grades have advantages for certain specific applications, but in general the nickel-copper steels may be considered as possessing similar mechanical properties and approximately equivalent welding and forming qualities.

An investigation of the welding qualities of 11 high-tensile structural steels was made in Britain by L. Reeve.[12] Mechanical properties presumably in the as-rolled plate and chemical analyses of five nickel containing steels included in the test are given in table XI.

[10] *"Steel Aircraft Tubing of NE 8630," by A. J. Williamson, Metal Progress, January* 1944.

[11] *"Nickel-Copper, High-Strength Steels Meet Specs. for Welded Construction," by A. E. Gibson, Yoloy Steel, Youngstown Sheet and Tube Co., Youngstown, Ohio.*

[12] *"A Summary of Reports of Investigations on Selected Types of High-Tensile Steels," by L. Reeve, Institute of Welding, Quarterly Trans., October* 1940.

Butt welds were made with a mild-steel covered electrode using single V-type joint with included angle of 65° for both ½-in. and 1-in. plates. All plates were welded at room temperature except the 3 pct nickel steel "E," which was preheated to 400°F to prevent cracking. Tensile tests were made on welded specimens and impact tests made on speci-

TABLE IX

Weld Properties

Steel	Condition of Material	Yield Point, Psi	Tensile Strength, Psi	Elongation, Pct	Location of Failure
A	As Welded	55,800	65,300	33.0	Parent metal
B	As Welded	66,300	91,800	27.0	Parent metal
A	950°F 1 hr	63,500	80,000	31.5	Parent metal
B	950°F 1 hr	94,000	100,800	18.5	Weld
A	1200°F 1 hr	63,000	71,500	31.0	Parent metal
B	1200°F 1 hr	78,800	88,000	16.5	Weld
A	1650°F 1 hr	51,400	65,600	42.5	Parent metal
B	1650°F 1 hr	69,000	81,300	17.5	Weld

TABLE X

Physical Properties

Thickness of Plate, In.	Yield Strength, Psi	Tensile Strength, Psi	Pct Elongation in 2 In., Free Bend	Location of Fracture
7/16	52,200	68,000	18.8	Weld
3/8	50,100	74,000	15.6	Weld
5/16	49,400	70,200	23.4	Parent metal
1/4	51,300	75,000	14.1	Weld

mens notched in the center of the weld and on specimens notched in the center of the weld and on specimens in which the bottom of the notch was at the junction of the weld and parent metal. Tensile and impact results of tests of welded specimens are shown in table XII.

Welding of Pressure Vessels

Pressure vessels fabricated by welding are usually subjected to more rigid inspection and tests than welded structural members or welded machinery. Most boiler drums and other pressure vessels must be welded in accordance with requirements issued by U. S. Navy Bureau of Ships, ASME Boiler Code, Bureau of Marine Inspection and Navigation, American Bureau of Shipping, Joint ASME-API Code or various State inspection boards which usually follow the ASME codes.

Welded low-carbon 2 pct nickel steel drums have been used by the petroleum refining industry to show temperature service for dewaxing propane, for fractional distillation and for controlling reactions. Some test results[13] of welds of two nickel steels suitable for this type of construction are listed in the follow-

TABLE XI

Analysis and Mechanical Properties of High Tensile Steel Plate (Reeve)

Type	No.	Pct C	Pct Mn	Pct Si	Pct Ni	Pct Cu	Pct Mo	Thickness of Plate, In.	Yield Point, Psi	Tensile Strength, Psi	Elongation in 8 in.	Reduction in Area, Pct	Izod Impact, Ft-Lb
2 Pct Nickel	D	0.20	0.68	0.11	2.44	.....	.....	1/2	54,000	77,300	24.5	51.8	56
2 Pct Nickel	D							1	51,200	73,600	26.5	53.5	52
3 Pct Nickel	E	0.31	0.59	0.22	3.12	.....	.....	1/2	66,700	94,500	21.8	46.3	34
3 Pct Nickel	E							1	63,200	89,600	21.3	45.8	34
Low-carbon nickel	N	0.09	0.38	0.14	1.96	0.95	.....	1/2	54,300	71,500	26.2	59.4	76
Copper	N							1	52,000	69,200	29.2	59.8	38
0.20 Pct C nickel	P	0.20	0.70	0.17	1.93	1.05	.....	1/2	62,000	87,800	17.5	42.2	49
Copper	P							1	62,000	88,900	19.7	50.2	30
Nickel-copper-molybdenum	L	0.065	0.60	0.03	1.31	1.13	0.10	1/2	54,900	70,300	25.0	45.4	58

TABLE XII

Tensile and Impact Results on Butt-Welded Specimens of High-Tensile Steel Plate (Reeve)

Type	No.	Plate Thick., In.	Yield Point, Psi	Tensile Strength, Psi	Izod	Ft-Lb Junction
2 Pct Nickel	D	1/2	53,200	73,300*	32	85
	D	1	48,400	73,600*	20	57
3 Pct Nickel	E	1/2	63,800	81,500	21	43
	E	1	65,500	81,800	39	45
Low-carbon Nickel-copper	N	1/2	52,400	69,700*	38	105
	N	1	48,800	68,800*	53	104
0.20 Pct C Nickel-copper	P	1/2	63,500	90,700*	37	70
	P	1	63,800	85,800	31	42
Nickel-copper Molybdenum	L	1/2	51,700	68,400*	48	71

* Broke in plate outside weld.

ing tables. Welds were made in 1 in. plate with 5/16 in. covered electrodes of nickel-vanadium steel.

	Pct C	Pct Mn	Pct Si	Pct Ni	Pct V
2 Pct Ni plate	0.28	0.60	0.22	2.19	....
Weld metal	0.08 to 0.14	0.60	0.30	1.12 to 1.27	0.14 to 0.24
3½ Pct Ni plate	0.17	0.44	0.19	3.72	....
Weld metal B	0.05 to 0.11	0.50	0.25	1.64 to 1.76	0.07 to 0.11

After welding, the 1-in. thick plates were stress relieved at 1200°F for various lengths of time but received no other heat treatment before or after welding. The room temperature tensile properties obtained are listed in table XIII.

As an illustration of use, the pressure vessels for propane dewaxing built several years ago for a large oil company were made of steel averaging 0.25 pct carbon, 2.25 pct nickel and 0.65 pct manganese[14]. The specifications which these large size plates, mostly over an inch in thickness, were required to meet were as follows:

Composition, Pct				Tensile Strength, Psi	Yield Point, Psi	Elongation in 2 In., Pct	Charpy Impact at −50°F, Ft-Lb
C	Mn	Si	Ni				
0.20 to 0.30	0.50 to 0.80	0.25 min	2.00 to 2.50	70,000	40,000	30	15

Actually, however, the tensile properties exceeded these minima by a wide margin. The values given below represent typical test results after the standard heat treatment of normalizing at 1500°F followed by a stress relieving temper at 1200°F after welding, as shown below.

Low-carbon 3-pct nickel steels have been used for welded pressure vessels operating at low temperatures at pressures as high as 400 psi. The following data represent averages on welded plates 5/16 in. to ¾ in. thick containing 3-pct nickel as reported by a leading fabricator of such vessels. The shape of the notch was not stated but was presumably of the keyhole type. All of the pressure vessels made of this steel passed all of the tests prescribed by the ASME Class I Welding Code governing the construction of welded pressure vessels, which includes X ray examination of all main weld seams and tensile and ductility tests on weld samples from each vessel. Welds were made with heavily coated nickel-steel electrodes.

Room temperature tensile tests of plate and weld metal resulted, see page 75.

Stress relieving at 1200°F. Data furnished by A. J. Moses, Combustion Engineering Co., Chattanooga, Tenn.

Some tests on double V butt welded joints in ¾-in. plate were conducted by the Baldwin Locomotive Works on nickel steel and carbon-steel boiler plate to determine the suitability of these materials for welded locomotive boilers. The analyses of the two plate materials were as follows:

Steel	Pct C	Pct Mn	Pct Si	Pct Ni
Carbon	0.21	0.29	0.18	....
Nickel	0.17	0.51	0.21	2.43

The carbon steel was welded with an approved brand of mild-carbon steel covered electrodes. The nickel steel was welded with covered electrodes the analysis of the deposit being approximately 0.08 pct C., 0.51 pct Mn., 1.89 pct Ni and 0.20 pct Mo. Results of tensile, Izod impact and fatigue tests are given in table XIV.

Some supplementary tests with the same type of welded joint and using a modified type of nickel-steel electrode but of about the same alloy content were made on 1-in. nickel steel boiler plate of the following analysis:

Pct C	Pct Mn	Pct Ni
0.20	0.80	1.97

The results shown in table XV were secured after stress-relief anneal at 1100° to 1150°F.

The following typical tensile values for low-carbon nickel steel plate suitable for welded pressure ves-

Location of Test Piece	Tensile Strength, Psi	Yield Point, Psi	Elongation in 2 In., Pct	Reduction in Area, Pct	Bend Test of Weld, Pct Elongation
Longitudinal	80,100	55,000	40.0	62.4	....
Transverse	77,400	49,400	40.0	55.9	....
All-Weld Metal	71,000	58,900	30.5	65.2	68

TABLE XIII

Physical Properties of Stress Relieved Plates

Drawn at 1200° F, Hr.	Parent Metal				Weld Metal			
	Tensile Strength, Psi	Yield Point, Psi	Elongation in 2 In., Pct	Reduction in Area, Pct	Tensile Strength, Psi	Yield Point, Psi	Elongation in 2 In., Pct	Reduction in Area, Pct
0.28 Pct C, 2.19 Pct Ni STEEL								
2	76,500	47,400	30.0	59.4	93,800	89,750	16.0	33.4
6	76,500	47,850	30.0	57.3	76,700	64,150	23.5	48.6
12	74,400	38,650	33.0	66.1	83,100	72,500	21.0	44.9
36	73,150	35,700	30.5	66.1	80,400	69,400	24.0	55.7
0.17 Pct C, 3.72 Pct Ni STEEL								
2	77,150	48,650	29.5	58.6	88,000	77,150	21.0	56.2
6	84,150	50,000	26.5	56.0	81,900	70,300	25.0	58.3
12	87,600	42,000	25.0	50.0	77,400	68,600	24.0	50.3
36	92,200	51,000	20.5	40.7	78,250	63,000	23.5	49.2
0.09 Pct C UNALLOYED STEEL								
2	45,600	24,500	44.5	75.4	55,400	43,500	35.0	62.8
6	46,950	23,400	45.0	80.9	54,050	40,850	38.0	67.3
12	47,250	24,350	43.0	74.3	52,800	39,150	21.0	41.9
36	44,000	21,650	45.0	79.0	54,750	40,000	34.0	64.7

TABLE XIV

The Results of Tensile, Bend Break, Izod Impact and Fatigue Tests of a Carbon and Nickel Boiler Plate and Welds

Steel			Test					
							Izod Impact, Ft-Lb	
Type	Material	Direction	Type	Yield Strength, Psi	Tensile Strength and Endurance Limit, Psi	Elongation, Pct	A	B
Carbon	Plate-unanneal	Longitudinal	8 in. flat tensile	36,650	60,350	28.1	25½	22
Carbon	Plate-unanneal	Transverse	8 in. flat tensile	35,850	60,200	26.2	23	18½
Carbon	Plate-anneal (1)	Longitudinal	8 in. flat tensile	34,400	58,500	28.4	30	25
Carbon	Plate-anneal	Transverse	8 in. flat tensile	35,000	59,700	26.2	23	20
Carbon	Weld-anneal	Transverse	8 in. flat tensile	35,600	58,400	15.1	69¾	....
Carbon	Weld-anneal	Transverse	2 in. flat tensile	....	61,700	20.2	....	....
Carbon	Weld-anneal	Longitudinal	0.505 tensile	52,000	61,500	32.5	....	....
Nickel	Plate-unanneal	Longitudinal	8 in. flat tensile	49,850	74,000	26.2	78	65½
Nickel	Plate-unanneal	Transverse	8 in. flat tensile	48,400	74,000	26.2	49	42½
Nickel	Plate-anneal	Longitudinal	8 in. flat tensile	49,900	71,200	27.5	81½	75½
Nickel	Plate-anneal	Transverse	8 in. flat tensile	48,500	71,700	26.8	47½	43
Nickel	Weld-anneal	Transverse	8 in. flat tensile	49,400	73,200	10.4	65½	....
Nickel	Weld-anneal	Transverse	2 in. flat tensile	53,000	75,500	19.5	....	....
Nickel	Weld-anneal	Longitudinal	0.505 tensile	62,500	73,000	29.5	....	....
Nickel	Plate-unanneal	Longitudinal	V-notch impact	.....	.....	....	78¼	65½
Nickel	Plate-unanneal	Transverse	V-notch impact	.....	.....	....	49	42½
Nickel	Plate-anneal	Longitudinal	V-notch impact	.....	.....	....	81½	75½
Nickel	Plate-anneal	Transverse	V-notch impact	.....	.....	....	47½	43
Nickel	Plate-unanneal	Transverse	V-notch impact	.....	.....	....	69	*
Nickel	Plate-anneal	Transverse	V-notch impact	.....	.....	....	65½	*

(1) Annealing stress relief temperature 1150-1175°F.
(A) Notch parallel to rolled surface of plate.
(B) Notch normal to rolled surface of plate.
* Notched in direction of weld at center of weld face.

sels and for all deposited metal were reported by Theisinger.[15]

	Pct C	Pct Mn	Pct Si	Pct Ni	Pct Mo
Plate	0.17	0.75	0.21	2.25	0
Weld	0.10	0.54	0.08	2.30	0.29

1-in. Plate, stress relieved.

Yield Strength, Psi	Tensile Strength, Psi	Elongation, Pct in 8 In.
52,000	75,000	26

0.505-in. All weld metal, stress relieved.

Yield Strength, Psi	Tensile Strength, Psi	Elongation, Pct in 2 In.
67,000	80,000	26

There has been some interest in ferritic steels for welded vessels that will operate at temperatures of −320°F. A steel that offers some promise but differs from what has been available commercially is a low-carbon 8½-pct nickel steel. After double-normalizing and tempering at 1075°F representative properties for the material are as follows:

Yield strength, Psi	68,000
Tensile strength, Psi	95,000
Elongation, Pct	26
R. A., Pct	60
Charpy ft-lb (keyhole notch)	52

After welding with austenitic 25° pct chromium-20 pct nickel welding rod, and stress relieving at 1050° to 1100°F, representative impact properties −320°F in the weld, in the heat affected zone and in the base metal are as follows:

Impact Properties, ft-lb
(Charpy Keyhole Notch at −320° F)

Base Metal	Heat-Affected Zone	Deposited Metal
22,21	22,20	22,26

Because of the high nickel content it is essential to keep the carbon low in this steel to limit hardness and secure high ductility and toughness. The carbon content should not exceed 0.12 pct and less than 0.10 pct is preferred.

Plates up to 2 in. in thickness have been welded with several types of electrodes without any difficulty but chromium-nickel welding rods and a modified Inconel are the only electrodes that so far have developed satisfactory low temperature impact properties in the deposited metal. Satisfactory welds, free from cracks have been made both with and without preheating.

Fatigue Strength of Arc Welded Joints

Many fatigue tests have been made on welded specimens of nickel-alloy steels. Some of these tests have been on highly polished specimens in the R. R. Moore type of machine, while others have been made on full sections. In general, fatigue strength obtained with polished specimens, is a function of the tensile strength and the soundness of the weld. In clean welds with good fusion throughout, the endurance limit determined with polished specimens approaches but is generally slightly less than the fatigue strength of the unaffected base material.

The fatigue strength of welds on full size parts is a function of the geometry and the surface condi-

[13] *"Impact Resistance of Some Steels and Welds at SubZero Temperatures," by R. K. Hopkins, Journ. Am. Weld. Soc.,* 13, *October* 1934, *p.* 16.

[14] *"Nickel Steels at Low Temperatures," by B. G. Aldridge and G. C. Shepherd, Jr., Metals and Alloys, June, July* 1936.

[15] *W. S. Theisinger, Welding Journal, August* 1939.

[16] *M. Wilson, W. H. Bruckner, J. V. Coomble and R. A. Wild, University of Illinois, Eng. Exp. Station Bulletin* 32.

[17] *R. C. Boehm, Welding Journal Res. Sup., September* 1938.

[18] *A. J. Williamson, Welding Journal Res. Sup., January* 1944.

[19] *F. W. Thorne, A. Hunter and A. J. Hipperson, Transactions Institute of Welding, March* 1944.

tions at the joint. If a reinforcing or cover layer is permitted to extend above the base material, a notch effect obtains, resulting in lower fatigue strength than if the weld was ground flush with the base material. Whenever fatigue is a factor, best results can be secured by grinding the welded joint smooth and making sure no undercutting has occurred.

Tests on some butt-welded, ½-in. high tensile plate of approximately 83,000 psi tensile were reported by Wilson[16] and coworkers. Results indicated that the fatigue strength was directly affected by the abrupt change in section at the edge of the deposited metal which resulted in stress concentration.

The fatigue strength of welded Yoloy (0.12 pct max C, 2 pct Ni, 1 pct Cu) after three different types of heat treatment and using the R. R. Moore rotating bend machine as reported by Boehm[17] were as follows:

Heat Treatment	Endurance Limit, Psi	
	Unwelded	Welded
Hot-rolled	47,000	30,000
Stress relieved 1250° F (furnace cooled)	42,000	30,000
Normalized 1650° F (furnace cooled)	38,000	28,000

Fatigue studies on a special type welded tubular structure of NE 8630 steel were reported by Williamson.[18] In all cases failure originated in the heat affected zone at the junction of the bend and the tube, indicating the influence of notch effect.

A very comprehensive study of the fatigue properties of welded 3½ pct nickel steel was made by Thorne, Hunter and Hipperson.[19] Welds were made

Location of Test Piece	Condition	Tensile Strength, Psi	Yield Point, Psi	Elongation in 2 In., Pct	Reduction in Area, Pct
Plate	as-rolled	81,000	52,300	28.0	59.0
Plate	stress relieved	78,800	.....	31.0	57.0
Weld Metal	as-welded	70,800	57,800	22.5	39.5
Weld Metal	stress relieved	67,800	51,500	32.5	60.5

TABLE XV

The Results of Tensile and Bend Tests on Welded 1-in. Nickel-Steel Boiler Plate

Sample	Test	Test Results: Yield Strength, Psi	Tensile Strength, Psi	Elongation, Pct	Reduction in Area, Pct	Remarks
A	Short-gage tensile[1]	43,100	66,600	16.5[2]	.....	Weld held, failed in plate
F	Short-gage tensile[1]	43,800	67,200	18.5[2]	.....	Weld held, failed in plate
...	All-weld tensile[3]	68,300	77,200	20.0	28.5	Multiple cracking on one side, shear break.
C	Free bend[4]	.....	.....	36.8	.....	No cracking on bending and squeezing flat.
E	Bend around 1-in. diam. rod[5]	.....	.....	43.4	.....	No cracking on bending and squeezing flat.

[1] Flat 2-in. gage-length specimen, 1½-in. test width with weld across it.
[2] Across 2-in. including weld and plate.
[3] Standard 0.505-in. tensile bar.
[4] Face of weld in tension.
[5] Face of weld in tension, free bend after bending 105° around rod.

TABLE XVI

Summary of Fatigue Tests ‡

	Specimen No.	Stress Cycle, Psi	Endurance 10^6 Cycles	Position of Fracture	Remarks
Unwelded Plate	1/1	40,300	0.378	—	—
	1/2	38,000	4.474	—	—
	1/3	37,000	>17.172	—	Unbroken
	1/4	37,500	7.816	—	—
	1/5	37,200*	>2.66	—	Buckled, unbroken
	1/6	37,200	>27.802	—	Broke in thread
As-welded-with-mild-steel electrodes	2/1	29,100	0.198	Weld center	—
	2/2	26,900*	>16.978	—	Unbroken
	2/3	28,000	0.472	Weld center	—
	2/4	27,500	2.600	Weld center	—
	2/5	27,000	5.120	Weld center	—
	2/6	27,000	1.102	Weld center	—
As-welded with 18-8 Cr-Ni austenitic electrodes	3/1	29,100	>21.060	—	Unbroken
	3/1	39,200	1.360	Weld center	—
	3/2	31,400	>12.744	—	Unbroken
	3/2	38,600	1.360	Weld center	—
	3/3	35,800	>12.446	—	Unbroken
	3/3	38,100*	14.500	Between weld and plate (not in fusion zone)	Plate appeared to be laminated.
	3/4	40,300	0.240	Between weld and plate continuing through both	—
	3/5	38,100	13.058	Weld center	Heated in last stages.
	3/6	38,600	0.020	Weld center	—
Welded with mild-steel electrodes and stress relieved	4/1	29,100	0.882	Weld center	—
	4/2	26,900	0.408	Weld center	—
	4/3	26,600	1.138	Weld center	—
	4/4	25,800*	>21.422	—	Unbroken
	4/5	26,600	8.938	Weld center	Fractured through small gas-hole.
	4/6	26,900	0.578	Weld center	Fractured through small gas-hole.
Welded with austenitic electrode, stress relieved	5/1	39,200*	10.092	Through weld	Rugged fracture
	5/2	40,300	0.054	Mainly in plate	Plate appears laminated.
	5/3	39,800	> 6.486	—	Broke in thread.
	5/4	39,800	2.342	Partly in plate, partly in weld	Heated in last stages.
	5/5	39,500	0.040	Mostly in plate	Rugged fracture.
	5/6	38,600	0.356	Through plate and weld	Plate appears laminated.

* Fatigue limit. ‡ Thorne, Hunter and Hipperson.

Pct C	Pct Mn	Pct Si	Pct Ni	Yield Strength, Psi	Tensile Strength, Psi	Elongation in 8 In., Pct	Reduction in Area, Pct
0.32	0.55	0.20	3.27	57,300	90,700	13.0	46.6

on normalized ½-in. plate, composition and properties of which are shown above:

The test specimens were prepared with a reduced section 2 in. long and 0.35 in. in diameter at the center and tapering up to 0.90 in. in diam at the end. The tests were made in a Haigt electromagnetic 6-ton machine operated at a frequency of 3000 cycles per min (alternate tension and compression).

The effect of different treatments and effect of different electrodes is summarized in table XVI.

Next week spot welding, upset-butt welding, forge welding, oxy-acetylene welding, oxy-acetylene pressure welding, and flame cutting will be discussed.—Ed.

Steam Platens Fabricated by Rolling

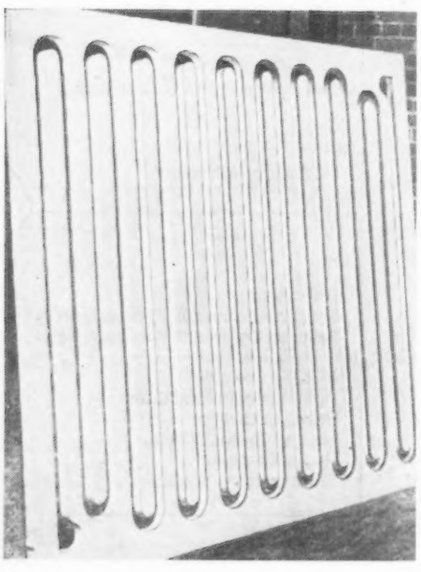
TEMPERATURES of high uniformity in all surface areas, elimination of hot and cold spots, and efficient heat transfer, have resulted from the use of Labyrinth Steam Platens designed and fabricated by Lukens Steel Co., Coatesville, Pa. Lukens has developed its steam platens as a rolling mill product in which three separate steel plates are bonded homogeneously into one unit. Machining, of course, is necessary to finish outer surfaces and to cut inlet and outlet ports.

In the platen fabrication, the rolled steel center plate is flame-cut to any desired labyrinth design, depending upon service requirements. A conventional design pattern is shown in fig. 1. The center plate is tack-welded to a bottom plate to position the fingers forming the labyrinth. The third plate is placed on top to facilitate handling during subsequent processing. The pack is heated to welding temperature, and then passed through the rolling mill, by which process it becomes one thoroughly bonded homogeneous plate. A cut-away view of a Lukens steam platen is shown in fig. 2. The platen may be flame-cut to size and desired contour on the edges if necessary. The platen thus produced may be treated as a solid plate of steel which may be bent or formed to shape for drums, molds, heating kettles, or other applications.

Wide flexibility of design to suit service requirements is made possible by this method of manufacture. This type of labyrinth is applicable particularly to long platens requiring uniformity in temperatures over the entire surface. Engineering each platen to fit the condition under which it is to be used assures resistance to internal and external pressures. (A standard inspection test of 1000 psi internal hydraulic pressure has been adopted.) Where necessary, steel of high wear-resisting qualities may be applied as the top and bottom plates.

Another advantage of the Lukens platen is the form of the labyrinth which contributes to the smooth flow of the heating or cooling medium. There are no square corners or dead ends to form pockets which obstruct free and even circulation. As a result, cleaning is facilitated, erosion is minimized, and leaks are forestalled. The elimination of leaks makes the application of these platens desirable for circulating cooling media which operate at temperatures of 700°F or higher. Surface temperature variations are reduced to a minimum through the high rate of heat transfer assured by the labyrinth form and uniform thickness of the top and bottom plates.

In the design of these platens, a reduction in mass is possible, which combined with a high transfer rate, contributes greatly to their successful application in cyclic operations. While the minimum thickness is considered to be 1 in., the length, width, and maximum thickness are limited only by the capacity of Lukens 206-in. Mill—the world's largest plate mill—which produces plates up to 195-in. wide or up to 25-in. thick.



LEFT

FIG. 1—Center plate with labyrinth passages flame cut to conventional design. This plate is placed between two others, and the three are bonded into a single unit by hot rolling.

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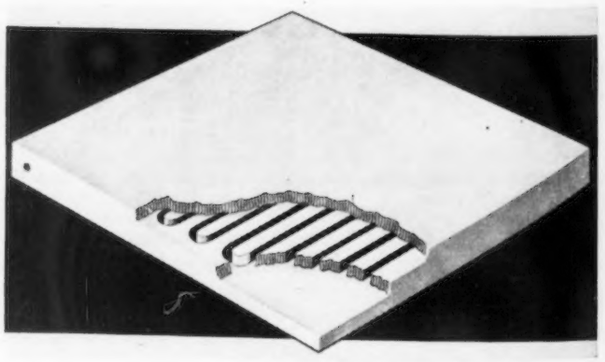
RIGHT

FIG. 2—Cut away view of a finished platen showing the rectangular shaped labyrinth.



Flame-Hardening Small Machined Parts

A VERTICAL flame-hardening installation used by a well-known manufacturer of materials-handling equipment has overcome the distortion that resulted from the furnace-hardening of small machined parts. This flame-hardening setup handles small parts such as gears, rollers, wheels, shafting, small pins, and other circular parts having diameters between 1½ and 12 in. These parts, formerly hardened by furnace-heating, followed by a water quench, were often so distorted after hardening that they could not be used, and in some instances could be reclaimed only by costly grinding operations. The flame-hardening process virtually eliminates such distortion due to hardening. As a result, both the rejection rate and finishing costs are substantially reduced.

The spin-hardening method is used for hardening these parts. With this method, the piece to be hardened is rotated rapidly while being heated by a series of stationary oxyacetylene flames. When the part has been heated to the correct hardening temperature, the flames are withdrawn, and a spray of water is directed upon the work while it is still spinning. This spin-hardening method assures a uniform case on all areas of the part.

This machine is equipped with six flame-hardening heads. These are separate adjustable units, however, and any combination of them may be used, depending on the amount and type of heating necessary. For hardening parts under 2 in. in dia such as shafts and pins, only three heating heads are used. For hardening relatively thin pieces, the number of heating flames per head can be reduced by replacing the rows of unneeded flame tips with plugs.

The complete operation is subject to exact procedure control made possible by the use of a special control device which can be adjusted for each hardening job. The control box and timer are set according to specifications worked out by the engineers, after which the cycle of heating and quenching becomes fully automatic. The heating flames and the water sprays are then turned on and off automatically in correct sequence by solenoid valves. The operator merely positions the work to be hardened and pushes a button to start the sequence of heating and quenching.

The work is clamped in position in several ways. For small parts, such as small-diameter shafts and wheels, a quick-acting centering device is used. For larger work, a tapered center fits over the spindle and centers the work. This center is made heavy enough to hold the work firmly in the machine.

After the parts are hardened, they are tested with a Scleroscope. The hardness ranges between 71 to 75 on this scale, which is equivalent to about 540 Bhn. The depth of hardness varies from 1/32 to ⅛ in., and can be controlled as desired.

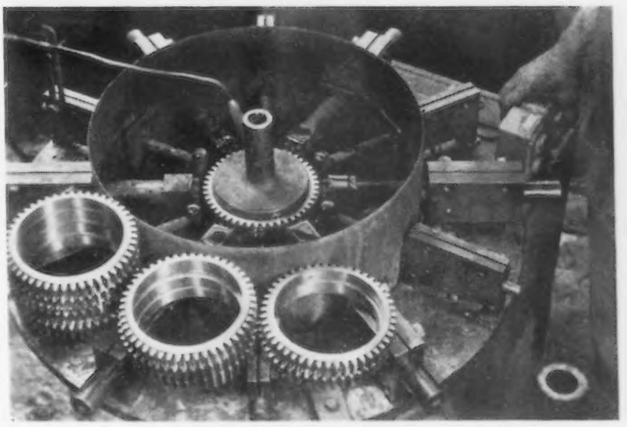
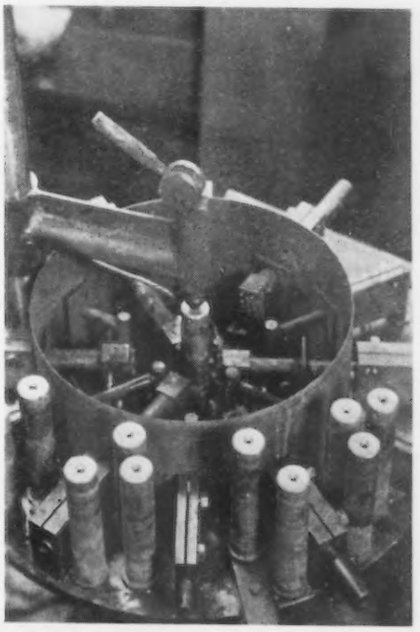


FIG. 1—Flame-hardening machine set up for hardening gears. The single flame visible at the top is a pilot light.



RIGHT

FIG. 2—A quick-acting centering device is used to hold small shafts in place. Only three of the heating heads will be used in this setup.

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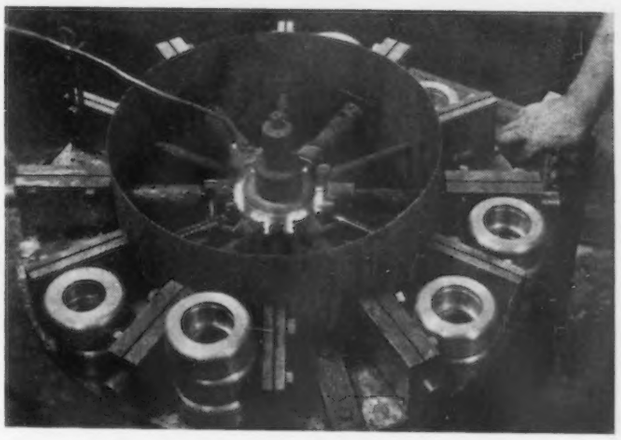
BELOW

FIG. 3—Setup for hardening machined rollers, using all six heating heads.



New Lathes Announced by Monarch

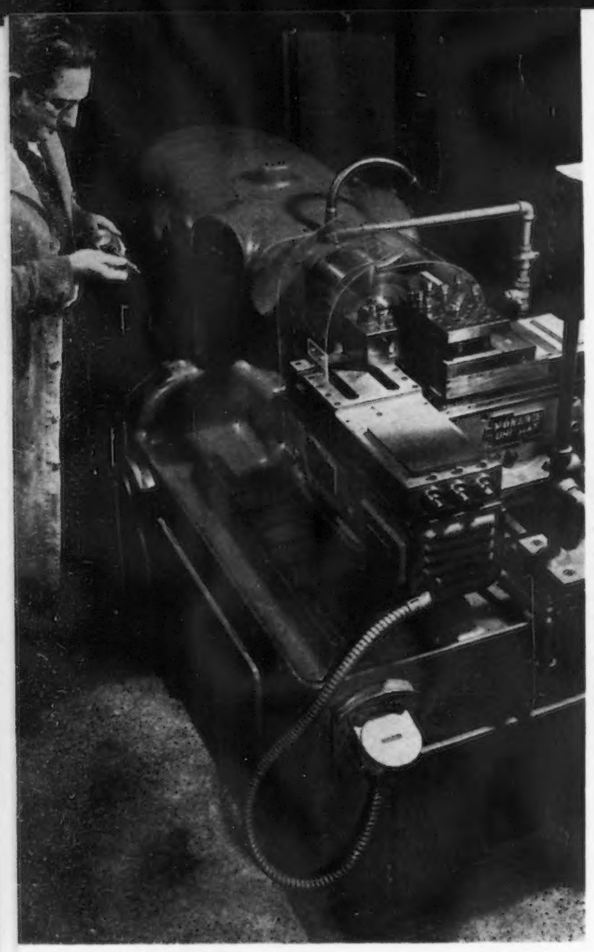


FIG. 1 — Entirely new in conception, the Uni-Matic features one or more independently operated, electrically controlled, motor-driven cross slides which may be arranged at any desired angle to suit the work.

HALTED by the outbreak of war, but continued at greatly increased tempo ever since its ending, development work on the Monarch Machine Tool Co.'s line of precision-built lathes culminated in the recent showing at Sidney, Ohio, of several highly interesting and completely new machines now in production.

From a production standpoint, the new Uni-Matic is perhaps the most outstanding, and represents an entirely fresh approach to the performance of turning, facing, and boring operations with extreme accuracy. Radically different from the usual engine lathe, the machine consists essentially of two members, (1), a simplified version of the conventional lathe base and headstock, and (2), from one to three specially designed, individually motor driven tool slides mounted on swiveling bases to permit turning, facing, and boring operations from almost any angle.

These tool slides, known as Uni-Mats, are basically individual motor driven compound rests which can be grouped about the spindle in whatever arrangement will best facilitate the application of the cutting tools to the work.

Each Uni-Mat is equipped with an electrically controlled ac motor which will traverse the main slide at 100 ipm until automatically slowed down to a predetermined feed rate for the remainder of its total travel of 4 in. At the end of the feeding cycle it can immediately revert to 100 ipm rapid traverse return, or dwell a given number of seconds before returning. Three adjustable micrometer stops control the cycle. Rate of feed is controlled by sets of change gears which make possible feeds of from ½ ipm to 13 ipm. A dc motor may also be used, and the same range of feed rates can be had by the use of two sets of change gears and variations of the motor speed.

The units are built in two models, one equipped with tool relief, the other with a solid top slide. The relief can be made to operate in either direction, depending

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FIG. 2—Universal toolmakers' lathe incorporating a lead-screw variator and special slow-speed spindle drive to adapt it particularly to the use of the mold maker.

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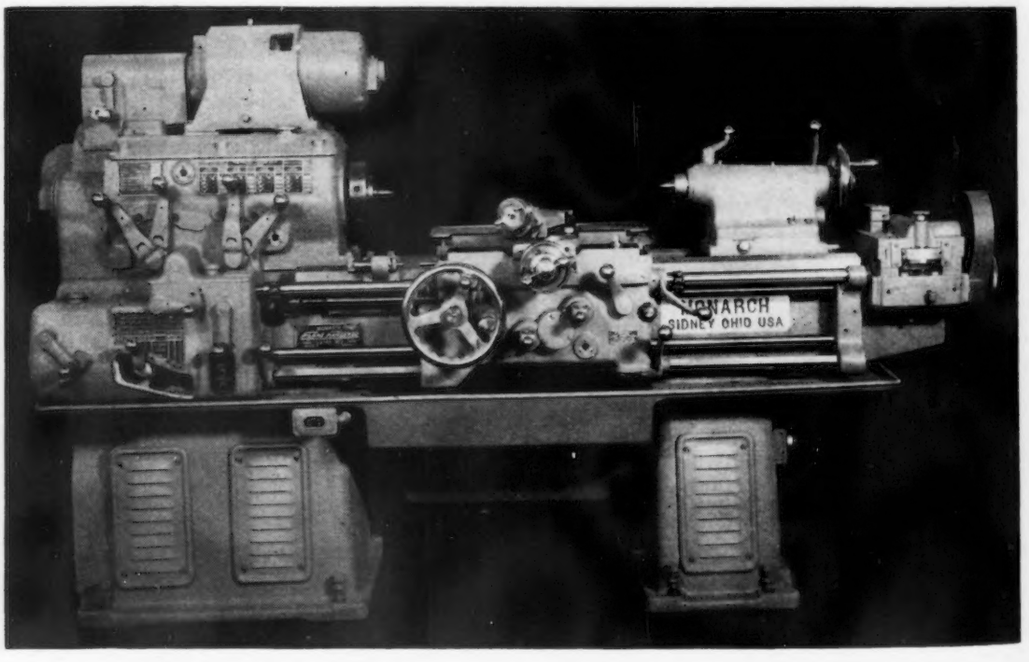

on whether the operation is boring, facing, or turning.

Since the only connection to the slides is a single cable carrying the electric circuits to the separate control panel, it is possible to position each unit in exact accordance with the work, and it is possible to obtain considerably more accurate duplication of the machining cycle than is possible through hydraulic or cam-operated mediums. After the micro-switches have been positioned to control the cycle, the slides may be retimed with reference to each other so that there will be no lost time between the functioning of the several units. This is done merely by changing the electrically interlocked timers.

Three spindle speed ranges are available from the one motor. One has a top of 1000 rpm, the second a top of 2000 rpm, and the third, 3000 rpm. From top speed, the spindle can be stopped in slightly over a second, and will attain top speed after starting, in the same time.

Mold Maker's Lathe

Another new machine is the universal toolmaker's lathe developed expressly for mold makers. In addition to all standard features which make it suitable for regular precision toolmaker's work, the machine incorporates two new ideas. One is an adjustable leadscrew variating mechanism which can be adjusted to compensate for the shrinkage of the material to be molded. When a thread is to be placed in a mold, and great accuracy is required, the lead of the thread must be greater in proportion to the shrinkage of the material. Regardless of the extent of shrinkage, even if as small as 0.001 in. per inch, the variator may be set to compensate for this, and the thread chased in the normal manner.

The second new feature is a special slow speed drive, which can be connected at will, mounted on top of the main headstock, and permitting spindle speeds as low as a fraction of a revolution per minute. This is intended for use when milling operations are to be performed on the lathe without removing the workpiece from the chuck, and is particularly useful for internal or external thread milling.

Mona-Matic Lathe

Still another new lathe is the Mona-Matic, designed specifically as a manual or semiautomatic machine for first or second operation work on gear blanks, straight or flanged bushings, and various types of shafts with one or more steps. It has an unusually wide range of spindle speeds, from 75 rpm to 3000 rpm, and front and rear carriages which incorporate several new features.

The front carriage can be equipped with either hand return of longitudinal or transverse power driven feed, or a semiautomatic cycle incorporating power driven longitudinal feed toward the headstock and rapid traverse return. Important is the provision whereby the front carriage can pass the tailstock base, which can be clamped anywhere along the rear ways of the bed.

The rear carriage for facing and necking work has its own motor, an electrically controlled cycle, and feeds which can be changed through pick-off gears. It is provided with power driven rapid traverse in and return, and because of its independent motor drive, requires no mechanical tie up with the front carriage.

Headstock lubrication is by a newly devised mist

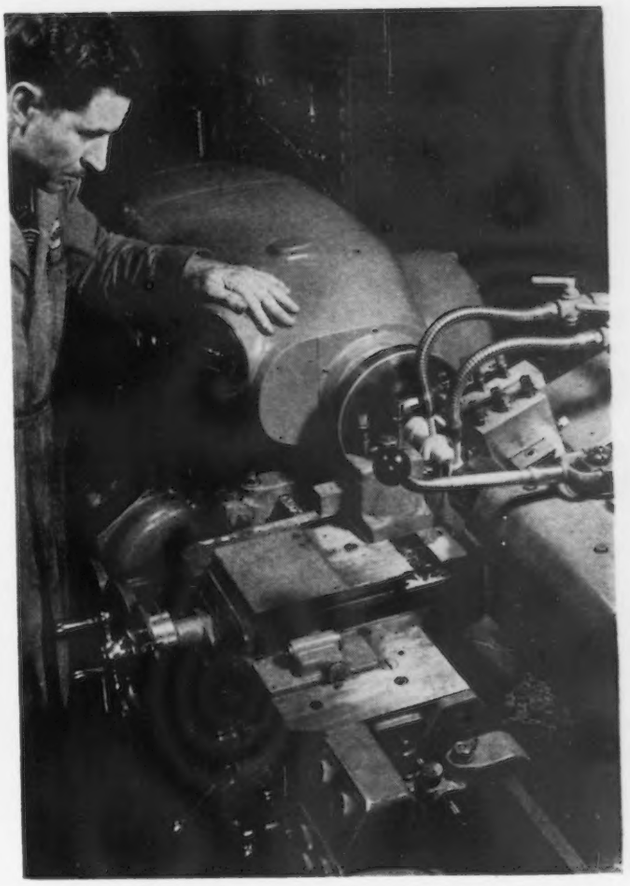

FIG. 3—Designed as a manual or semiautomatic machine for first and second operation work, the Mona-Matic features spindle speeds up to 3000 rpm, and independent motor drive for the rear cross slide.

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FIG. 4—Similar in appearance to its predecessor, the new model EE 10 in. sensitive precision toolmaker's lathe incorporates a new thread chasing mechanism, forced lubrication, and automatic interlocking of controls.

system which keeps all working parts cool even when the spindle is operating at 3000 rpm. The spindle has a flanged type nose for the direct mounting of chucks and drive plates, and provision has been made for mounting different types of air equipment, such as cylinders and draw rods, as well as various classes of air operated work drivers. A multiple automatic length feed stop is furnished for use in turning shafts with multiple steps.

Toolmaker's Lathe

In addition to the above, a new model of the EE 10 in. Sensitive Precision Toolmaker's lathe is in production. It retains the same streamlined appearance as its predecessor, but incorporates a number of improvements. Higher sustained speeds are possible, due in part to design changes which facilitate more complete lubrication, regardless of what operation the machine is performing. Apron bearings, bed and carriage ways, and cross slide are provided with forced feed lubrication, and end gears are totally enclosed and running in oil.

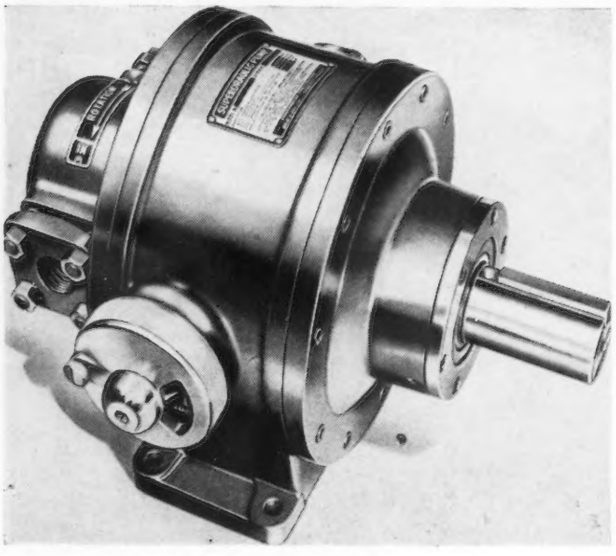
It is no longer necessary to change end gears to obtain the full range of feeds and threads. A single lever, located on the front of the gear box, handles the shift from belt drive with 50 speeds to end gearing with 60 threads. Another innovation is the thread chasing mechanism which provides independent adjustment to cross slide at the operator's option, even though working against a positive metal to metal stop.

Threading and feeding mechanisms have been interlocked so they cannot operate together, and a lever on the front of the headstock controls forward and reversing, and has been equipped with automatic neutral lock. In the same way, a leadscrew reversing lever on the apron has an automatic lock to prevent the accidental starting of the spindle. For rapid precision threading, an adjustable reverse speed is provided to give quick return for multiple cuts.

High Pressure Hydraulic Pump

MAKING a major advance in hydraulic pump design, the Superdraulic pump just announced by Superdraulic Corp., Dearborn, provides a means of obtaining double the pressures that have been available from the best of contemporary pumps. Light enough for a man to handle, this pump will deliver 0 to 17 gpm at 1200 rpm, and develops 5000 psi and 40 hp. It is thus able to generate the desired tonnage for hydraulic presses and cylinders without the use of expensive cylinder assemblies, and without employing cumbersome intensifiers and accumulators. By providing a single source of high pressure and high volume, it eliminates in many cases the necessity for costly and complicated double pump arrangements.

FIG. 1—Available in two models, the constant delivery and the variable delivery, the Superdraulic pump is capable of continuous duty development of 5000 psi for all types of applications.



The Superdraulic is a radial type plunger so arranged that centrifugal force maintains the plunger rollers in contact with an elliptical reaction ring. The plungers are fitted to cylinders in a rotor in one or more banks of eleven plungers per bank. The rotor turns on a fixed pintle which has suitable ducts and ports for directing the oil inlet into those cylinders passing through two opposite quadrants, and also for directing the oil delivery out of those cylinders passing through the other two opposite quadrants.

Each plunger makes two inlet and two delivery strokes per revolution. A sturdy equalizing axle, journaling a roller at each end, is universally attached to the outer end of each plunger. This unique construction provides ample bearing areas for the plunger load components exerted radially and rotatively on the axle bearing surfaces, and insures zero side loading of the plunger.

In variable delivery pumps, two banks of eleven plungers each are arranged in a single rotor. The plungers in the two banks are arranged in parallel relation. Each pair of parallel cylinders is in open communication by means of a drilled passage in the rotor. The plunger rollers of each bank roll against a separate elliptical reaction ring. These reaction rings are rotatably mounted in the pump housing and are geared together so that they rotate in opposite directions in response to rotation of the volume control gear.

At full delivery, the major axes of the elliptical reaction rings are parallel, and at zero delivery, the major axes are 90° apart. Under the latter condition, the net delivery stroke is zero, since the displacement of the plungers moving radially outwardly exactly equals the displacement of the plungers moving radially inwardly in both delivery quadrants and both suction quadrants.

As the angle between the major axes is reduced

from 90°, the net plunger displacement increases. When this angle becomes 0°, the major axes are parallel and both plungers of a pair of parallel plungers reciprocate in phase through full delivery and suction strokes.

Provision is made for a simple spring type plunger return. This is to insure plunger return when pumsp are operated below the speed at which centrifugal force is adequate (approx. 100 rpm). Variable delivery pumps are equipped with any one of a number of different type volume controls which are interchangeably mounted on the pump. The sensitive manual dial type control may be mounted on either side of the pump. The surge-proof balance pressure compensator is constructed to mount on either side of the pump with a volume dial indicator mounted on the side opposite the pressure compensator.

Plunger reaction loads exerted on the elliptical reaction rings are balanced through the volume control gear, the torque of one reaction ring balancing that of the other. Thus light and sensitive manual or automatic pressure and volume controls can be interchangeably employed.

A small oil circulating pump is incorporated for the purpose of circulating oil under near zero pressure direct from the oil tank through the pump housing and back to the tank. This insures suffiicently low pump housing temperatures of the variable delivery pump under the condition of extreme pressure operation at zero or near zero delivery.

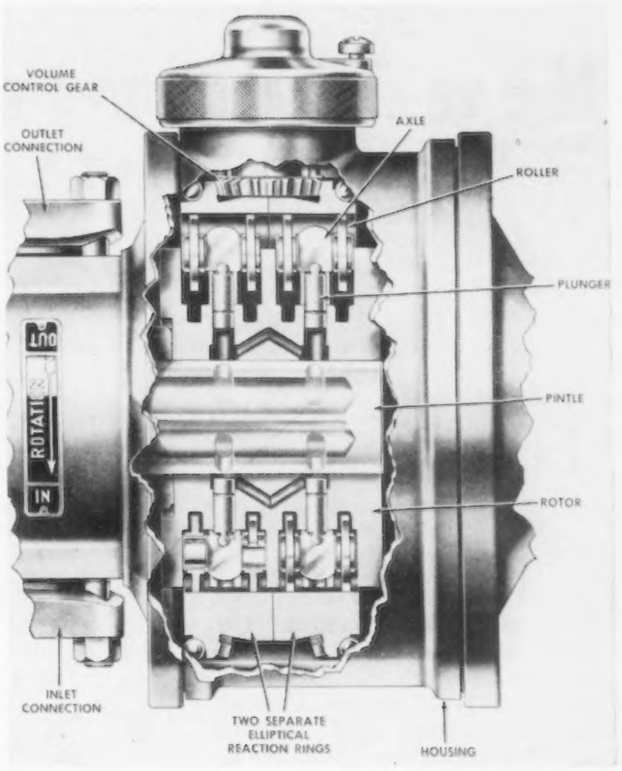


FIG. 2—An axial cross sectional view of the new pump showing the arrangement of the plungers and the elliptical reaction rings.

Cyanide Bath Attack on Copper Brazing Material

ACCORDING to a test conducted by North American Aircraft Inc., Inglewood, Calif., the estimated average weight loss of copper brazing material upon submersion in the regular Perliton liquid case-hardening bath is 30 mg per sq in. per hr. It was also noted that some of the copper strips gained in thickness, probably caused by the formation of a thin copper cyanide coating.

The various steps in this test are described below, the results of which are given in the table.

Ten pieces (1 x 4 x 0.032 in.) of soft copper sheet (QQ-C-501) were obtained and a small hole was drilled in one end of each piece. The strips were then polished with steel wool and cleaned with carbon tetrachloride. Each piece was measured and its thickness was checked with a micrometer so that the total surface area could be determined. The specimens were then weighed to the nearest 0.1 mg.

The copper strips were suspended in a Perliton bath No. 13. The operating temperature was recorded and a sample of the bath was taken and analyzed to determine the cyanide content.

A pair of specimens was removed after the following time intervals: 15 min, 30 min, 60 min, 90 min, 120 min. Each pair, after removal from the bath, was dipped in Farrar No. 2 quenching oil for about 2 min, withdrawn, thoroughly washed with water, and wiped clean with a dry cloth. The actual weight losses, and the weight loss per sq in, per hr were determined. The rate of dimensional decrease was obtained, based on weight loss and remeasurement of the samples.

Weight Loss of Copper Immersed in Liquid Case-Hardening Bath

Sample No.	Immersion Period, Min	Before Immersion		After Immersion		Weight Loss	
		Weight, G	Surface Area, Sq In.	Weight, G	Surface Area, Sq In.	G	Per Sq. In. per Hr, G
1	15	17.8830	(1x4x0.031) 8.310	17.8807	(1x4x0.031) 8.310	0.0023	0.0011
2	15	17.4564	(1x4x0.031) 8.310	17.4525	(1x4x0.031) 8.310	0.0039	0.0019
3	30	17.3548	(1x4x0.030) 8.300	17.3457	(1x4x0.031) 8.310	0.0091	0.0022
4	30	17.5016	(1x4x0.030) 8.300	17.4936	(1x4x0.031) 8.310	0.0080	0.0019
5	60	17.6484	(1x4x0.031) 8.310	17.6245	(1x4x0.032) 8.320	0.0239	0.0029
6	60	17.7191	(1x4x0.030) 8.300	17.6917	(1x4x0.031) 8.310	0.0274	0.0033
7	90	17.7898	(1x4x0.030) 8.300	17.7383	(1x4x0.031) 8.310	0.0515	0.0041
8	90	17.8335	(1x4x0.031) 8.310	17.7833	(1x4x0.032) 8.320	0.0502	0.0040
9	120	17.7175	(1x4x0.030) 8.300	17.6621	(1x4x0.032) 8.320	0.0554	0.0033
10	120	17.8908	(1x4x0.030) 8.300	17.8332	(1x4x0.032) 8.320	0.0576	0.0035

Note: Perilton bath operating temperature = 1600° ± 10°F.
Sodium cyanide content = 18.0 pct.

New Equipment . . .

Machine Tools

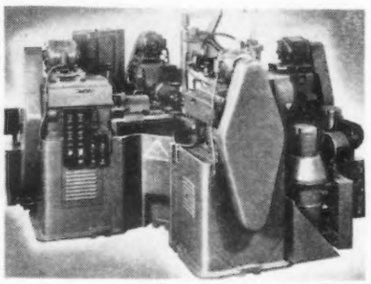
. . . In this week's issue are described interesting developments in machine tools, including grinding machines, milling machines, safety devices, tapping machines, tool and cutter grinders, milling and boring machines, power feed attachments, and various other machines.

A VERSATILE 24-in. disc grinder has been announced by *The Kindt-Collins Co.*, 12651 Elmwood Ave., Cleveland 11, and is said to be adaptable to all kinds of grinding on metal, wood or plastics. Special features of the machine include a heavily ribbed, normalized and machined table; table tilts 45° down and 25° up by worm and gear drive; both faces of grinding disc can be used; circular and core

print fixture has a capacity of 22 in. in diam. and is wedge-shaped with 10° angle. The disc will accommodate both flexible back cloth and paper back abrasives.

Hollow Milling Machine

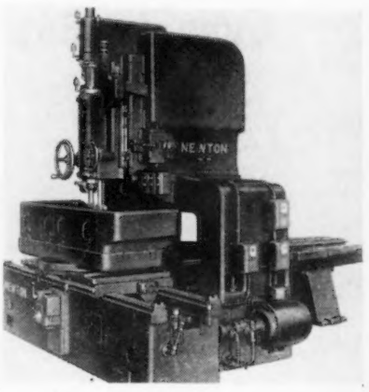
A HOLLOW milling machine for heavy duty work has been announced by *LeMaire Tool & Mfg. Co.*, Dearborn, and one feature that characterizes this special purpose machine is said to be, that it is built up of several standard elements. A standard LeMaire No. 5000 Hydraulic Unit mounted on a standard base is used to power each of the four stations. All four



bases, arranged at right angles to each other, abutt a central base, which carries a special fixture. Each unit is a machine by itself and can be operated at speeds independent of the others. Since separate motors are employed to furnish power to the hydraulic pumps and to the spindles, any desired change in the speed of one does not affect the speed of the other. The spindles are of heavy duty construction and are mounted in a sturdy housing which slides on large guide bars. The large opposed Timken bearings have their front bearing positioned close to the cutter so the front overhang of the tool is reduced to a minimum.

Grinding Machine

AN improved Newton Heavy Duty Radius Link Grinding Machine designed to grind the radii of locomotive links and mating link blocks, has been announced by *The Consolidated Machine Tool Corp.*, Rochester 10, N.Y. With an extra rotary table attachment, internal bushing grinding can be handled. This machine is said to be built with vertical oscillating grinding head and reciprocating table, both operated by hydraulic cylinders. Individual motor drive is provided to grinding spindle, and also a separate motor pump unit for the hydraulic head and table movements. All movements are hydraulically operated, and trip dogs are adjustable to control the length of the table and head stroke. The slide, supporting the spindle head, is adjustable horizontally by the hand wheel at the front with

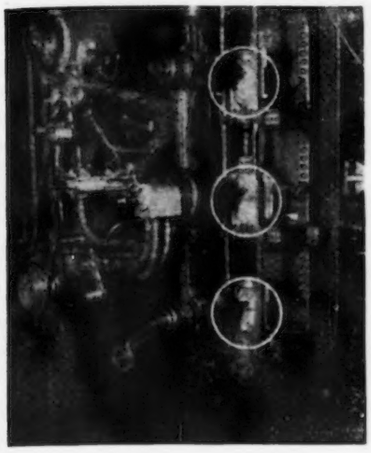


the micrometer collar to facilitate final setting of depth of the grinding wheel cut.

Duplicating Machine Attachment

AN inexpensive method whereby old types of duplicating machines limited to the use of hard models can be converted into up-to-date machines which work from soft models made of plaster or wood, has been announced by the *Turchan Follower Machine Co.*, 8259 Livernois, Detroit 4. It is claimed that by equipping the hard-model type of machine with a Tur-

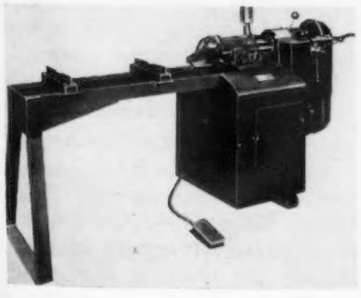
chan control valve, hydraulic cylinder and hydraulic power unit, it can be changed over into a machine with the full capacity of duplicating machine of the modern type. The advantage of a machine using



soft models in the making of molds and in the sinking of dies is that production can be gotten under way much faster than with machines using hard or metal-sprayed models. The attachment is also applicable to routers, profilers, lathes and milling machines to perform die-sinking operations, obviating the necessity of designing special machines for this purpose.

Combination Machine

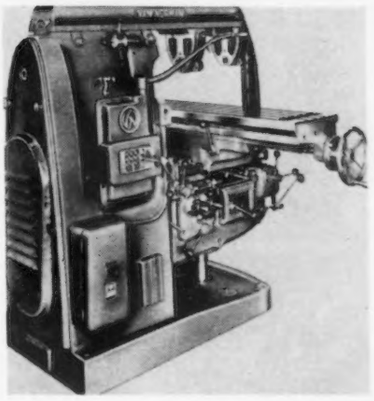
A HORIZONTAL combination drilling and tapping machine for high production drilling and tapping of extra long pieces, up to 96-in. long, with only one handling, has been announced by *The Cleveland Tapping Machine Co.*, 3610 Superior Ave., Cleveland. The outstanding feature is the possibility of drilling then indexing to tapping position and tapping the work



piece to proper depth. Each spindle can be independently adjusted for depth of travel and each spindle can be held to within 0.010 in. horizontal travel.

Milling Machine

A NO. 3 Horizontal Milling Machine especially designed for a wide range of general purpose and production milling, has been announced by *The Van Norman Co.*, Springfield, Mass. It is a large heavy duty miller, and has a 64-in. by 14-in. table permitting the user to handle heavy work. This machine is said to be compact, with rigidity and dependability assuring smooth operation on the heaviest cuts. It combines rugged strength with accuracy and sensitivity of operation and control. An important feature of the new transmission includes a heavy large diameter fly-wheel mounted on the spindle inside of the column assuring smooth, uniform application of power to the cutter. Other features include conveniently located spindle operator lever which is easily positioned for front or rear operation,



automatic lubrication to all moving parts, large diameter table feed screw, large dial graduated in thousandths, anti-friction bearings, hardened multi-splined shafts, and hardened alloy steel gears with greater tooth area.

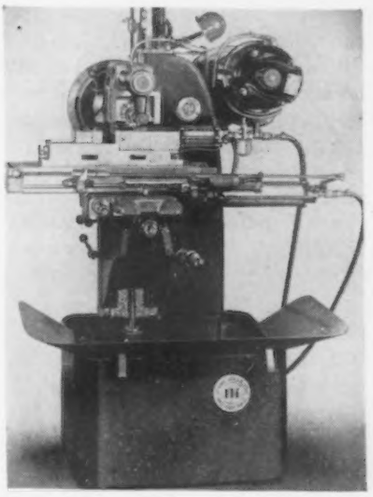
Milling & Boring Machine

A HIGH precision milling and boring machine, has been announced by *The Kearney & Trecker Products Corp.*, Herbert & Gott Sts., Milwaukee 14, and is known as the No. 3, Model T. General application of this machine includes precision milling, boring and threading operations in one setup on special machine members, gear boxes, box jigs, fixtures, and precision production work. Attention has been given to maintenance of the close alignments, and the table is fully supported throughout its entire travel. Ram type construction of the spindle slide maintains perfect alignment whether it is locked in position for milling operations or released while boring feeds are in use. A rear bearing ex-

tension eliminates overhanging at the back end of the spindle ram and fully supports the attached gear box during the entire ram travel. Since the longitudinal and verticle screws are used primarily for actuating the table and spindle head for milling feeds and rapid traverse, an end measuring system is supplied as standard equipment.

Power Feed Attachment

A POWER table feed attachment for the Nichols Miller, has been announced by *W. H. Nichols & Sons*, Waltham, Mass. This power feed attachment is said to offer rapid approach, maximum proper cutting feed, fast table re-

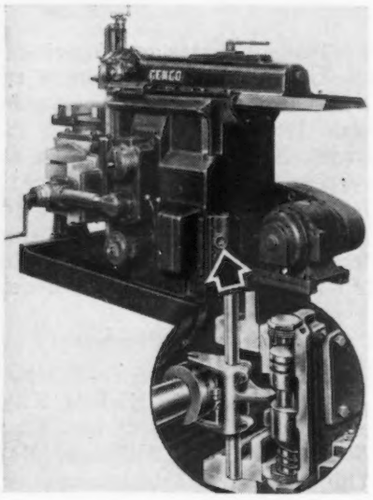


turn and shut-off. Thus the operator need only load and unload the work and thus often-times can run more than one machine on production work. The maximum cut-

ting stroke with this attachment is 9 in., and it can be operated from any shop air system carrying 75 to 175 lb of air.

Safety Device

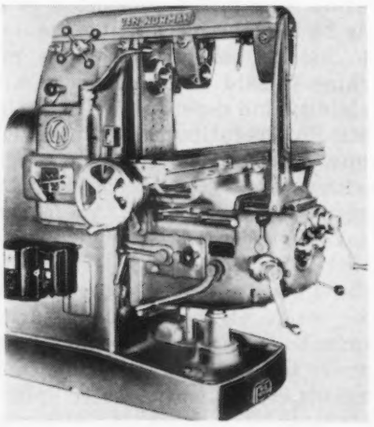
REPRESENTING the latest development in the design and construction of crank type toolroom shapers, is the Lubrigard Safety Device, which is a feature of GEMCO Shapers, announced by *General Engineering & Mfg. Co.*, St. Louis 4. The function of Lubrigard is to automatically prevent the ram of the machine from being started: (1) In case oil supply in reservoir is insufficient; (2) Should pressure in the system be



below the minimum required; (3) Should a leak or failure of the oil pressure system occur; (4) Should the filter become clogged; (5) Should the drive pulley rotation be incorrect. In addition it is said to prevent the clutch control leaver from being engaged while the drive pulley is at rest. This device is said to assure long, satisfactory shaper performance, because of adequate, automatically-controlled lubrication of all bearing surfaces.

Horizontal Miller

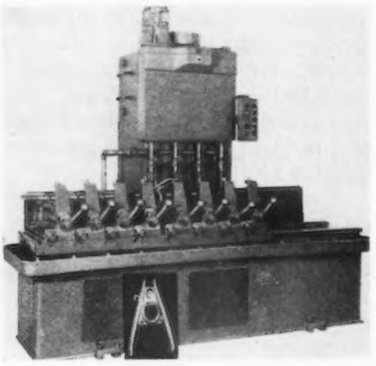
DESIGNED for horizontal milling applications of medium size and smaller parts, the No. 2 Medium Horizontal Miller has been announced by *The Van Norman Co.*, Springfield, Mass. Among its engineering features is the new Van Norman design which incorporates a heavy flywheel mounted on the spindle inside the column assuring uniform transmission of power to the cutter. It also features an improved built into the knee, feed transmission, built in safety devices to eliminate strain on any of the mechanisms should any overload occur, automatic lubrication of all moving parts to as-



sure proper oiling of the various mechanisms, and the new column base is large and heavy with scientific internal ribbing to assure solid rigidity for the spindle and spindle transmission as well as the knee.

Tapping Machine

A FOUR-spindle tapping machine for tapping automotive front wheel support brackets has been announced by *Snyder Tool & Engineering Co.*, 3400 E. Lafayette, Detroit 7. This machine has a welded steel column containing the tapping spindle drive motor, leadscrew mechanism and the nec-



essary depth control limit switches. The fixture table is equipped with eight fixtures, thereby making it possible to work on four parts while four finished parts are unloaded and the fixtures reloaded. The fixtures and the table move hydraulically from the loading to the working positions. The base of the machine contains the hydraulic equipment for moving the table and the fixtures back and forth. The lubricant for the taps is contained in the lower portion of the column.

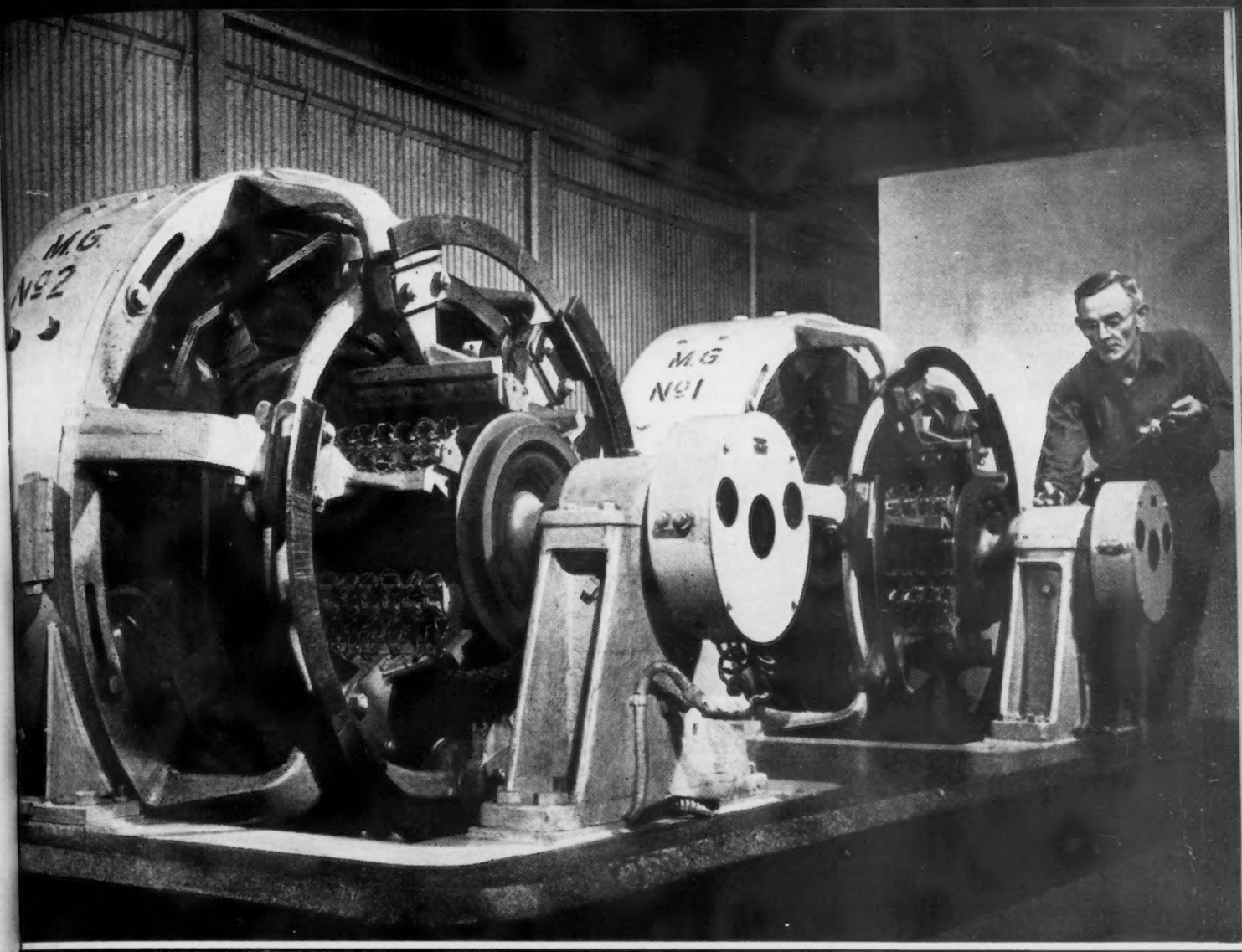
Tool and Cutter Grinder

DESIGNED to provide raising and lowering of the grinding wheel head and column and also for the cross feeding of the head and column, so that the position of sub-table and table remain fixed insofar as either verticle or transverse movement is concerned, the No. 60 Universal Cutter and Tool Grinder has been announced by *Gallmeyer & Livingston Co.*, Grand Rapids 4, and is replacing their No. 6 machine. This machine is so designed, that the operator may

stand up close to his work at all times, and the weight of the attachments in service and the work is carried directly over the supporting base. This machine is equipped with a greased-for-life precision ball bearing cartridge type spindle which requires no lubrication for the life of the bearings, and a one-shot system mounted in a convenient position in front of the column provides for the lubrication of the machine proper. It is also possible to supply the machine with a built-in motor driven dust collecting system.

Surface Grinder

A NEW No. 24 Duplex Rotary Surface Grinder has been announced by *Hanchett Mfg. Co.*, Big Rapids, Mich. Electronics with fingertip control have been incorporated into the machine for separate operation. This machine is really two machines in one, and in many classes of work one operator can turn out as much work as two operators on two machines. It is equipped with two rotary or magnetic chucks instead of one.



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• Non-basic companies under USWA contract ask for a divorce from remainder of dispute, citing wide variety of enterprises involved in the strike . . . Tool shop negotiations with UAW begin in Detroit.

DETROIT — If the Non-Basic Steel Coordinating Committee has anything to do with it, the coast-to-coast strike of the United Steel Workers of America Union of the CIO will be split up into the individual areas of discussion justified and logical in this conflict.

Functioning with objectives similar to that of a Pittsburgh-centered group, the Coordinating Committee has made its position known to John W. Snyder, reconversion czar, in a visit and letter from E. S. Evans, Jr., president of Evans Products Co. here.

Evans pointed out that approximately 700 miscellaneous companies having no connection with the manufacture of steel are involved in the strike, not because they have a dispute with their employees, but merely because they happen to have a contract with the USWA. Only 86 companies, said Evans, can classify as basic steel; the remainder are "made up of a heterogeneous group which could not even be termed an industry."

In his conversations with Mr. Snyder, Mr. Evans pointed out that the non-basic companies in the past have not had their wages set by the wage pattern of basic steel, but by the areas in which they are located. In Detroit, as an example, such producers have their scales built upon the wage levels paid by the automobile industry. In Pittsburgh, the steel industry is the bellwether. Mr. Evans points out, interestingly enough, that the basic rate for U. S. Steel Corp. workers at the present time is 78c an hr, while the base rate of the Evans Products is $1 an hr.

In May 1944, the National War Labor Board created a definite distinction between the basic steel companies and the non-basic firms. A separate panel was appointed, apart from the basic steel panel, to hear the miscellaneous companies. The board held "that the decision, or decisions, of the board in the steel cases will not predetermine" the miscellaneous companies. The situation, it is pointed out, is the same today as it was then, except that there is no governmental agency to which the miscellaneous companies can appeal.

Mr. Evans makes a good case for these companies he represents when he writes: "If an increase in price of steel is given, these miscellaneous companies will have to pay that increased price on steel plus any wage increase that might eventually be agreed upon. Therefore, they are caught in a two-way squeeze. In many instances any relief granted such companies by OPA would not help, as they would be priced out of competition because of the many of their competitors having no such wage demands presented to them due to their non-affiliation with the steel workers union."

HAVING summarized his case, the protagonist for the smaller companies calls on Mr. Snyder and Mr. Truman to order the USWA to put back to work the miscellaneous companies, after which they could resolve any differences which may exist by collective bargaining. "To date," says Mr. Evans, "there has been no collective bargaining as far as these companies are concerned, and the union has indicated that there can be no negotiations or bargaining until such time as the pattern has been set in the present controversy between the producers of steel and the union."

Actually, developments along the lines sought by Mr. Evans are beginning to appear, but they are as yet very preliminary, judged from his viewpoint. USWA, it is learned, has advised all of its district offices that they may negotiate individual contracts with any of the companies on strike, the settlement basis being an 18.5c raise retroactive to Jan. 1. To date, a scattering of Michigan companies have signed agreements with the steel union, while others would be signed were it not for the retroactive provision.

Interesting in this connection is

STRIKE NEGOTIATIONS: *President C. E. Wilson of General Motors extends his hand to Vice President Walter Reuther of the United Auto Workers at Washington conference.*

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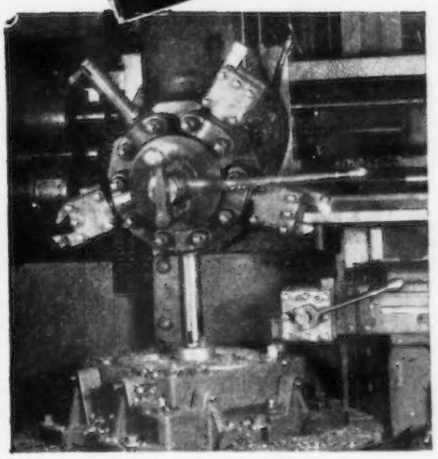
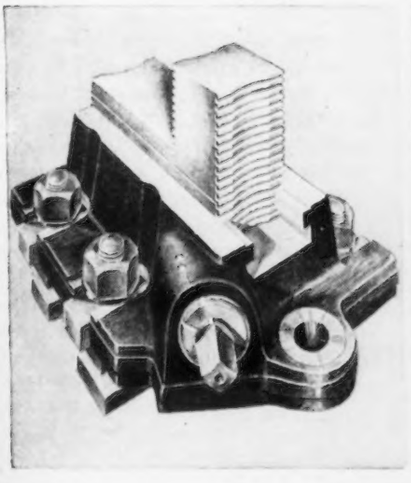
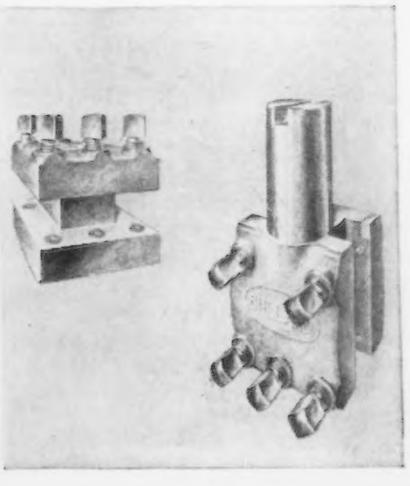


A machine's ability to perform is basically in the machine itself, but no matter how good the machine, it may be hampered by lack of good tools.

Balanced equipment is a valuable asset. Bullard general purpose Standard Tool Equipment for Vertical Turret Lathes is designed for maximum performance. Rugged and quickly applicable to the machine, these tools lower the cost of "change-over" and "set-up." Properly set on the machine they provide a sequence of operations which cuts time between cuts, as well as on cuts.

For your old Bullard Vertical Turret Lathes or your new machines, use Bullard Standard Tools. Ask for catalog RM-STC 7-12-44. This book should give you some profitable tooling ideas.





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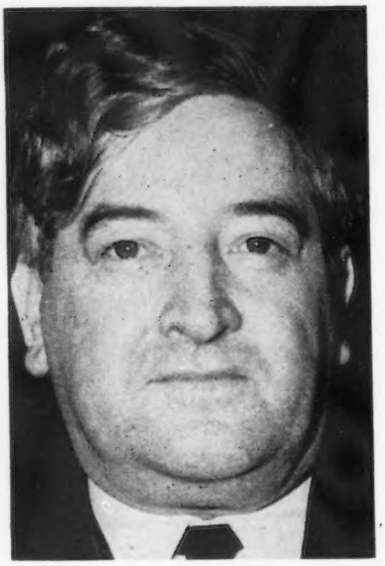
the list supplied by the Non-Basic Producers Committee of companies caught in the steel strike. They include a paper bag maker from Allentown, Pa., a wood box maker in East Chicago, a maker of abrasive wheels in Mansfield, Ohio, a cement company in New York, a food processor in Indianapolis and a screen door firm in Chicago. The Brooklyn Hospital Equipment Co. is included, apparently because it fabricates metal, and so is the Foster Bros. Mfg. Co., bedspring producer of Utica. Machine tool builders like Atlas Mfg. Co. at Kalamazoo are involved.

IT goes without saying that the present wave of industrial disputes, which gives good sign of having passed the climax point in the groping toward some coverall policy to placate labor, does not have the uniform backing of all labor, even all union labor. This was aptly demonstrated in the mass meeting of tool and die men gathered to get their instructions on stoppage of work ordered by General Motors, intended to intensify pressure on that company. The original plan had been to take care of any workers laid off by reason of the stoppage on GM work by puting them on committees whose duty would be to check up on operations in all tool and die shops, organized and unorganized, to see that the tabu was obeyed. These men were to be paid $8.00 a day, out of funds gathered by assessments of a dollar a day a piece on all workers remaining on the job. However, when the instruction meeting started off, intense protest immediately began over the dollar assessment feature, and it was finally dropped to the discomfiture of the union leaders who had conceived and supported the idea.

These tool and die shops, incidentally, began negotiations last week at the request of the United Auto Workers Union, seeking the 30 pct wage increase which has been all but abandoned except to introduce discussions. This demand, put on the table at the start of the negotiations, was countered by the shop association with the statement that it was difficult to offer any raise whatsoever and still remain in business, because the Detroit area rates are so much higher than in other localities that further increases might seriously jeopardize the opportunities for obtaining business. At the same time, the tool shops pointed out their worry, expressed in an earlier letter (THE IRON AGE, Feb. 28, 1945, p. 80) that their entire stability of operation was completely undermined by union policy which called for shutdown of work on their books in order to impose pressure on a customer company.



OLD TIMER: *James Dewey former member of the U. S. Conciliation Service staff, has not had much luck in settling the GM strike as yet. This would indicate a serious situation because Mr. Dewey is classed by both management and labor as a champion for "bringing 'em together" in the industrial field.*

U. S. Court Nullifies Ex-GI Super-seniority

Detroit

• • • **Super-seniority for veterans,** as outlined in the interpretations of the Selective Service Act of Gen. Lewis B. Hershey was declared invalid in a decision handed down here by Federal Judge Arthur F. Lederle. The office of the U. S. Attorney General plans to appeal the decision.

The case involved George A. Droste, a camber grinder at the Lansing (Mich.) plant of Nash-Kelvinator Corp. He went into Army service and on return reassumed his position from Nov. 30, 1944, until Jan. 15, 1945, when he was offered another job with less pay, due to plantwide seniority giving him precedence over others on the lower paid job.

Having later resigned, he filed suit, claiming the difference between his earlier $1.39 pay level and that which he actually received, maintaining that the Selective Service Act entitled him to employment at his pre-service rate as long as the company employed any camber grinders except other World War II veterans with greater seniority.

After the decision was handed down the CIO United Automobile Workers Union, which has consistently opposed the super-seniority interpretations of General Hershey, announced that it was instructing all its local unions to complete processing of grievances in all cases arising from employers' following the Hershey interpretation. The union said that back pay would be demanded for all time lost by workers, veterans and non-veterans alike displaced out of line with their seniority as a result of any super-seniority interpretation.

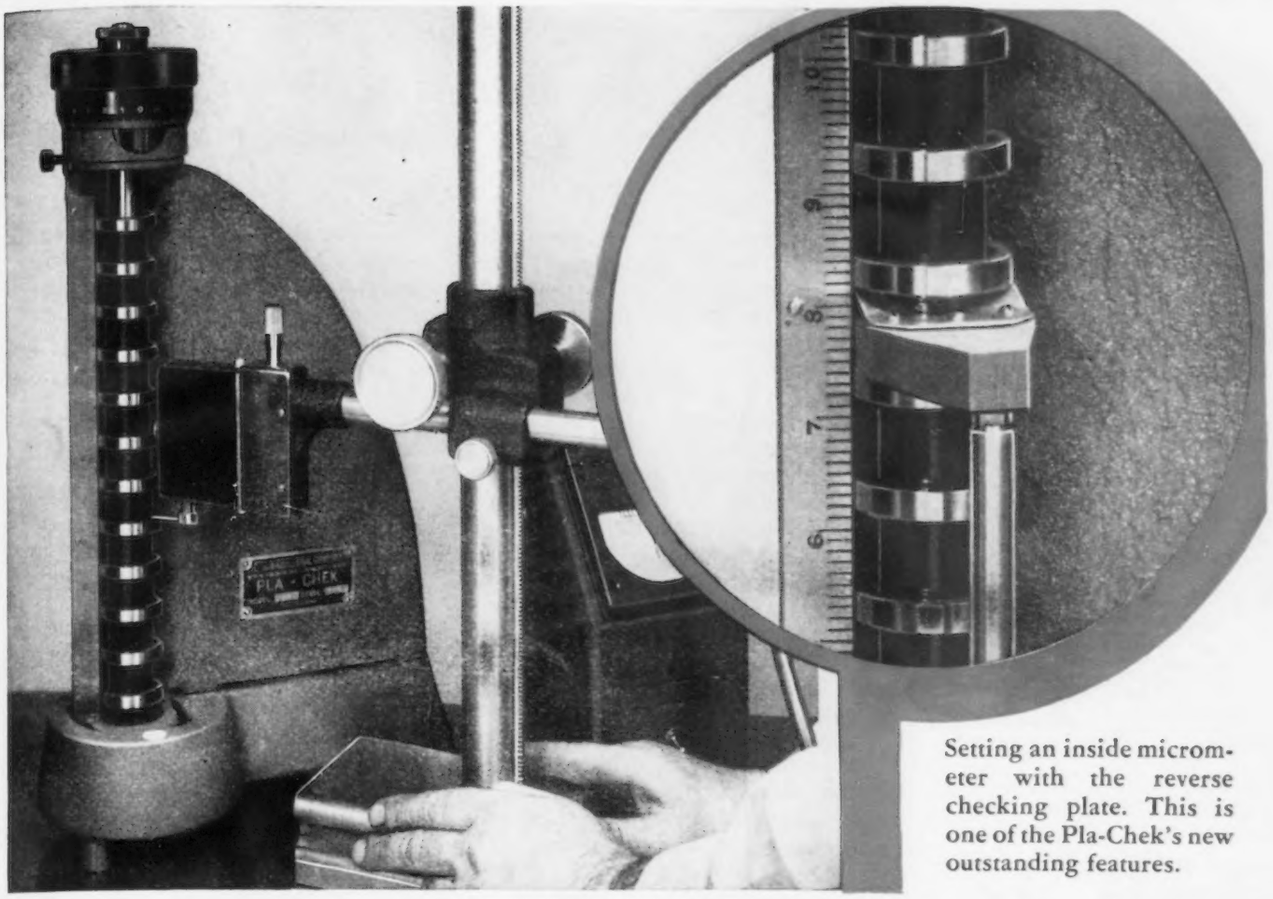
UAW Asks Increase For Salaried Workers

Detroit

• • • **In the midst** of negotiations with General Motors Corp., the CIO United Automobile Workers union requested recently that salaried office workers be granted the same increase awarded production workers when a settlement is finally reached.

A letter to the company pointed out that several units of GM salaried office workers represented by the UAW participated in and were covered by the election conducted by the National Labor Relations Board authorizing the strike which began last November. It was claimed that numerous salaried office workers of General Motors have since contacted the union to ask that UAW represent them in obtaining the same wage increase for hourly rated workers.

This letter was viewed as part of a long-range program in the minds of the union and its leaders for organizing the office help at General Motors. During the course of the strike, leaflets have been distributed several times to salaried people reporting to work at the General Motors Bldg.



Setting an inside micrometer with the reverse checking plate. This is one of the Pla-Chek's new outstanding features.

NEW FEATURES, NEW DESIGN, NEW SPEED AND ACCURACY WITH THE NEW . . .

Now, Cadillac's new accessories greatly increase the usefulness of the Pla-Chek. A 3″ accurately lapped riser raises the Pla-Chek above the surface plate so that it can be placed anywhere on the surface plate. This feature makes it more convenient for checking parts over in the center of a large surface plate, as well as increasing the range of the gage to 15 inches. For checking dimensions under 3 inches from the plate, the Pla-Chek may be lifted off the riser and set directly on the plate, allowing measurements to be taken from zero to 12″.

Another new feature is the reverse checking plate shown in the insert. This is a horseshoe-shaped device with a spring, that can be quickly and easily clipped to any 1″ step on the Pla-Chek bar. The under surface is lapped flat, and wrings to the upper measuring surface of the measuring steps. This makes it easy to quickly and accurately set a height gage indicator for checking the under side of parts to be measured.

A hardened and lapped steel button in the 3″ riser plate, directly under the reverse checking plate, makes it possible to set inside calipers, inside micrometers or dial-type inside indicating gages.

These new features are in addition to all the other Pla-Chek features: Inspections made 5 to 10 times as fast. Accuracy guaranteed to within .00005″ between any two points in the 12 inch range. Setting time less than 15 seconds.

Cadillac

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Write today for complete information or try Pla-Chek before you buy. We'll send it on Two-Weeks' Free Trial! If satisfied, send your check. If not, return Pla-Chek express collect and you owe us nothing. Write, Wire or Telephone Today. Reverse the charges. Telephone: PRospect 1644.

Cadillac **GAGE COMPANY**

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Washington . . . L. W. MOFFETT

• No standby ordnance facilities contemplated. . . . Will be declared surplus, says retiring Chief of Ordnance . . . Radio guided rockets and space ships foreseen.

WASHINGTON — All war-built ordnance industrial facilities will eventually be declared surplus, with none being retained in standby condition, if the policies of the retiring Chief of Ordnance, Lt. Gen. L. H. Campbell, Jr., are carried out by his successor, who will not be named until mid-summer. In the meantime the Ordnance Dept. will be directed by Maj. Gen. H. B. Sayler, Acting Chief of Ordnance, and former Chief of Ordnance in the European Theater.

General Campbell told THE IRON AGE on Jan. 29 that "if ordnance plants can be used to put people to work, then everything in Ordnance is for sale." It is the Ordnance Dept.'s view that sufficient funds for maintenance of standby plants could not be obtained from Congress, and that these plants will still be available should another emergency arise, if they are being operated by private industry.

Forecasting future rocket development to a point where artillery, as it is known today, will eventually be replaced by a combination of gun and rocket, General Campbell also revealed Ordnance development of a radio-controlled rocket which has been fired 50 miles in the air.

General Campbell says that rocket development coupled with the Signal Corps demonstration that radar waves can be bounced off the moon opens the way for radio-guided rockets and space ships, which could be sent anywhere in the world.

The general told a press conference that a better machine gun, as well as improved ammunition and artillery are already on ordnance drawing-boards. Rocket development has reached the stage where it can be safely predicted that rockets will equal guns in accuracy.

In regard to future research and development programs, General Campbell said that he is confident that the United States will be able to keep far ahead in ordnance development provided adequate funds are supplied by Congress. It is his firm conviction that the success achieved by the industry-ordnance team can be carried over into peacetime.

The ordnance program for canning equipment reserves (THE IRON AGE, Aug. 16, 1945, p. 104-F) has not proceeded beyond the expermental stage due to the lack of funds. However, Ordnance has not abandoned the program and hopes to be able to put it into operation as soon as Congress acts on the 1947 budget. Meanwhile, ordnance equipment is being greased and put into temporary storage. Sufficient equipment to equip several million men will be stored, contingent on congressional action in setting the size of the postwar Army.

In addition, Ordnance will use excess oil storage tanks, scattered throughout the country for the storage of guns, tanks, etc. Tanks up to 50,000 bbl capacity will be used and will be equipped with de-humidifiers to prevent corrosion and other deterioration. It is estimated that each tank can be de-humidified at a cost of about $150.

* * *

FEDERAL Trade Commission orders would be subject to more effective court review under H. R. 2930, which is before the House Interstate and Foreign Commerce Committee.

The legislation introduced by B. Carroll Reece, R., Tennessee, would permit those served with FTC cease and desist orders to obtain a review of such orders in the Circuit Court of Appeals, by filing in the Court, within 60 days of the service of the FTC order, a written petition asking that the order of the Commission be modified or set aside.

This legislation, which is conceded a good change of passage, would severely limit the penalty powers exercised by FTC in its function as an administrative tribunal.

The Commission would be furnished with a copy of petitions filed with the court and be required to submit all evidence in the case in question. If the FTC is upheld by the court the cease and desist order will then be binding upon the petitioner, who would still have recourse to the Supreme Court.

Violations of FTC orders after they have been upheld are punishable by a fine of $1000 for each violation, not to exceed $10,000 in the aggregate, under the bill.

The legislation also redefines false advertising. Under its pro-

o o o

European Theater Ammunition Expenditures

D-Day to VE-Day

Item	Expenditures in Rounds
Carbine, Cal. 30	130,022,000
Rifle, U. S. Cal. 30 M1903	56,164,000
Rifle, BAR Cal. 30 W1918A2	11,310,000
Rifle, U. S. Cal. 30 M1	241,885,000
Gun, Machine Cal. 30 Ground	392,088,000
Pistol, Auto. Cal. 45, M1911A1	97,369,000
Gun, Machine Cal. 50 BB Flex CB	105,619,000
Mortar 60mm M2 W/mount	4,881,196
Mortar 81mm M1 W/mount	6,324,249
Gun, 37mm AA (Carr Mtr Mult Gun) M 15A1	467,814
Gun, 37mm AT Wheeled	1,170,081
Gun, Auto 40mm AA	1,153,156
Gun, 57mm M1 Wheeled	631,080
Gun, 75mm Tank	2,003,952
Carriage Motor 75mm Howitzer M8	1,604,617
Carriage Motor 76mm Gun AT M18	972,650
Carriage Motor 3" Gun M10	1,639,780
Gun 90mm AA Mobile	1,022,141
Carriage, Motor 90mm Gun, M36	424,741
Howitzer, 105mm Field M2A1	16,808,080
Howitzer, 105mm M3 (Short Barrel)	1,972,349
Howitzer 155mm M1 M1918	4,548,526
Gun 155mm Field M1A1	1,395,224
Gun 4.5" M1	694,234
Howitzer 8" M1	484,523
Gun 8" Field	41,652
Howitzer 240mm M1	82,494
Fuses for Separate Loading Ammunition	8,830,681
Launcher, Rocket AT 2.36 inch (Bazooka)	1,310,823
Rifle-Grenades, Total	1,817,757
Mines	1,856,234
Torpedo Bangalore	73,734
Hand Grenades, Total	4,853,888

Grinding
FRAME BOLTS
100 PER HOUR ON A
CINCINNATI NO. 3 CENTERLESS
● These illustrations show a CINCINNATI No. 3 Centerless set up for grinding frame bolts by the infeed method. The complete length of the bolt under the head is ground to size in one operation. ¶ There are several reasons for using a No. 3 Centerless for jobs of this type. It is potentially a high production machine, yet it has a number of features to facilitate setup. Heavy duty construction permits unusually wide contact between work and wheel; FILMATIC grinding wheel spindle bearings withstand heavy cuts with no special attention; hydraulic profile truing over both wheels facilitates and speeds up the truing and dressing of the wheels; large diameter infeed handwheel with micrometer adjustments gives you diameter reduction as fine as .0001". ¶ The CINCINNATI No. 3 Centerless Grinder has a very definite place in railway shops. It will be to your advantage to investigate.
CINCINNATI
CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO, U.S.A.
CENTER TYPE GRINDING MACHINES
CENTERLESS GRINDING MACHINES
CENTERLESS LAPPING MACHINES

visions "false advertisement" means an advertisement, other than labeling, which is misleading in a material respect. In determining whether any advertisement is misleading, the bill says that "there shall be taken into account (among other things) not only representations made or suggested by statement, word, design, device, sound or any combination thereof, but also the extent to which the advertisement fails to reveal facts material in the light of such representations so as to prevent deception resulting from indirection and ambiguity, as well as from statements which are false."

• • •

Tightens Restrictions On Some Steel Items

Washington

• • • **Because of the** interruption of steel supplies, inventory restrictions have been tightened on certain steel products if bought by users at special sales under Pr. Reg. 13, CPA has announced. Special sales are sales made by persons who acquired or made the material for use and not for sale or resale and include sales of surpluses by government agencies.

Direction 9 to PR 13, prohibits the acceptance of delivery of: Hot or cold-rolled carbon steel sheet, 14-gage and lighter; flat galvanized sheet and strip; electrical silican sheet; tinplate; or wire rope and cable; by any person buying for use on a special sale under PR 13, if his inventory will result in more than he needs during the succeeding 45 days on the basis of his current or scheduled method and rate of operation, or in the case of a person whose operations are suspended due to a work stoppage in his own plant, more than he would need during the first 45 days after resumption of operations.

This direction temporarily supersedes the limited inventory exemption formerly applying to receipts of materials acquired at special sales under PR 13, and is intended to limit the acquisition of existing stocks of surplus steel by users to their current needs.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

NO, NO, CHARLIE, THIS AIN'T NO OLD ONE -- YOU'LL ROAR! HAAH HA-HA-- IT SEEMS A SOLDIER GOT OUT OF TH' ARMY -- HA-HA--
TO KEEP THEM WOLVES OFFA YOU, YOU GOT TO KEEP EVEN A CRACKED LIP A SECRET AROUND HERE!
HE DID TILL THEY SEEN HIM THROW SOME DILL PICKLES OUT OF HIS LUNCH BOX!
2-8 J.R.WILLIAMS
HEROES ARE MADE - NOT BORN
T. M. REG. U. S. PAT. OFF. COPR. 1946 BY NEA SERVICE, INC.

Corundum Ore Stocks Up, But Controls Held

Washington

• • • **A small year-end** increase in domestic stocks of corundum ores plus a substantial increase in supplies of optical grain corundum was offset somewhat by a drop in inventories of the wheel grain type, CPA has announced. However, CPA said, until an overall balanced supply under private contract is assured, present controls (under Conservation order M-89) must be maintained. The agency indicated that the supply-requirements situation will be reviewed periodically with the aim of relaxing controls as soon as practicable. Corundum ore stocks amuonted to 2,266 tons at the end of 1945 compared with 1,825 tons at the start of the year.

Public purchase contracts for South African ores were terminated at the end of the year because satisfactory private purchase contracts of ore from that source were effected in December. When private contracts are assured in adequate amounts to meet all corundum demands, government controls will be relaxed, CPA said.

•

Requests Financial Data

Washington

• • • **Declaring that** they are important to objective and up-to-date business information in carrying out price control, Price Administrator Chester Bowles recently announced that many business concerns throughout the country had been sent the annual reporting form (a) for filing brief financial reports with OPA. Mr. Bowles said that **the form has** remained practically unchanged since it was revised, condensed and simplified two years ago. Businessmen are being asked to file these reports within 60 days or less instead of the 90 days allowed in other years.

Form "b," the interim report used by OPA to collect financial data at the end of each quarter, it was pointed out, is also practically the same as last year's edition. OPA is still required to provide statistical summaries of financial data to other agencies of the government, Mr. Bowles said, to avoid duplication of requests from industry.

For lowest cost–SPECIFY THESE "STANDARDS"

Carboloy Standard Blanks include: 5 styles for "universal" use; 3 styles for reamers, scrapers (and centers)—in all the commonly used sizes and grades for machining all metals.

For 60-80% of all your carbide machining needs, you'll find Standard Carboloy Blanks tops in economy—flexibility—convenience. Here's why they rate so high in these important features—

1. *Low Price:* More than 50% of all general purpose Standard Carboloy Blanks range in price from 60 cents down to as little as 7 cents each!

2. *"Universal" Application:* Standard Blanks are designed for broad use throughout your range of machining requirements. With only a small, low-cost inventory in your crib, you're still prepared for quick tool-up on the average job.

3. *Stocked for Prompt Delivery:* Standard Blanks are stocked for quick delivery by Carboloy Company, and authorized distributors in 45 cities, coast to coast. Packaged in standard quantities, for your convenience.

Available in a wide range of sizes; in grades for cutting steel, cast-iron, non-ferrous metals and non-metallics. Write for FREE catalog GT-175R.

CARBOLOY COMPANY, INC.

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CHICAGO • CLEVELAND • HOUSTON • LOS ANGELES • MILWAUKEE • NEWARK • PHILADELPHIA • PITTSBURGH • THOMASTON

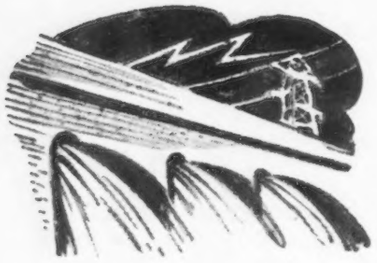
Also Sold by Leading Mill Supply Distributors

Standard CARBOLOY (TRADEMARK) CEMENTED CARBIDE *Blanks*

West Coast . . .

OSGOOD MURDOCK

• Producers and users face sectional problems in addition to those confronting nation . . . Freight rates, Geneva, Kaiser and proposed Northwest plant are only a few.



SAN FRANCISCO — Western steel producers and users confronted with the same labor troubles as others of their kind throughout the country, are beset with several additional uncertainties and possibilities which contribute nothing toward the formation of long-range plans.

Producers are greatly concerned with the outcome of the recent hearing before the Interstate Commerce Commission where the suspended $12.32 per gross ton freight rate for unprepared scrap moving from the Pacific Coast to the Group D area was put in the balance. The railroads and eastern steel producers testified in the early part of the hearing that such a rate was justified and that there was an abundance of scrap on the West Coast which was sorely needed in the Chicago area.

In the wind-up of the review before examiner F. R. Linn the "protestants" claimed that the $12.32 per gross ton is less than a reasonable minimum rate and that it is 43.3 pct of the applicable rate of $1.27 per 100 lb on finished steel from Pacific Coast origins to Group D, whereas the relationship generally in effect elsewhere is in the neighborhood of 70 pct. This testimony was given by Walter A. Rohde of the San Francisco Chamber of Commerce.

A. M. Mears, representing Oregon Steel Mills; O. R. Buckner, Electric Steel Foundry of Portland; Frank Wicklund, Isaacson Iron Works of Seattle; R. L. Lamborn and A. P. Heiner of Kaiser Co., Inc.; and Milo Spaich, Pacific States Steel Corp., Niles; testified for the "protestants." Their testimony purported to prove that because of expanded openhearth, electric furnace and foundry production in the West, this area will never again have more scrap than it needs. Mr. Lamborn reported that southern California, where the Kaiser steel plant is located, would use between 700,000 and 800,000 gross tons of scrap a year and that the area could not produce that quantity. He estimated that demand would exceed supply by about 200,000 tons per year. In refutation of the claim of the respondents that offerings of scrap had brought out only very low bids or none at all which indicated no scrap scarcity or alarm, the protestants claimed that this situation was caused by the uncertainty of the future when such offerings were made and because of the freight cost to many of the points in the West where the scrap might have been used.

In an effort to prove that the proposed rate was out of line, Mr. Heiner introduced an exhibit which purported to show that the protested rate yielded the railroads less per ton-mile than did the rates in effect from shipbuilding points on the Atlantic and Gulf points to Chicago.

WHETHER the special suspended rate will be reinstated or the established rate of $14.78 per gross ton prevail now rests with the I. C. C. and western producers are keeping their fingers crossed.

Other hauling rate changes loom in the offing—the all-water rate from the East and those in coastwise operations.

It is reported that since the War Shipping Administration last November appointed established shipping lines as their agents to operate approximately 50 ships in intercoastal trade, the WSA has been losing money steadily. Among the reasons for this unprofitable operation have been mentioned the OPA price set-up which allows shipping costs to be passed on to consumers; the demand for speed in shipment of scarce commodities which favors rail; and seasonal shipping habits. Best information indicates that instead of carrying a full cargo of approximately 10,000 tons (most ships involved are Victories) cargoes of 4000 tons are the rule.

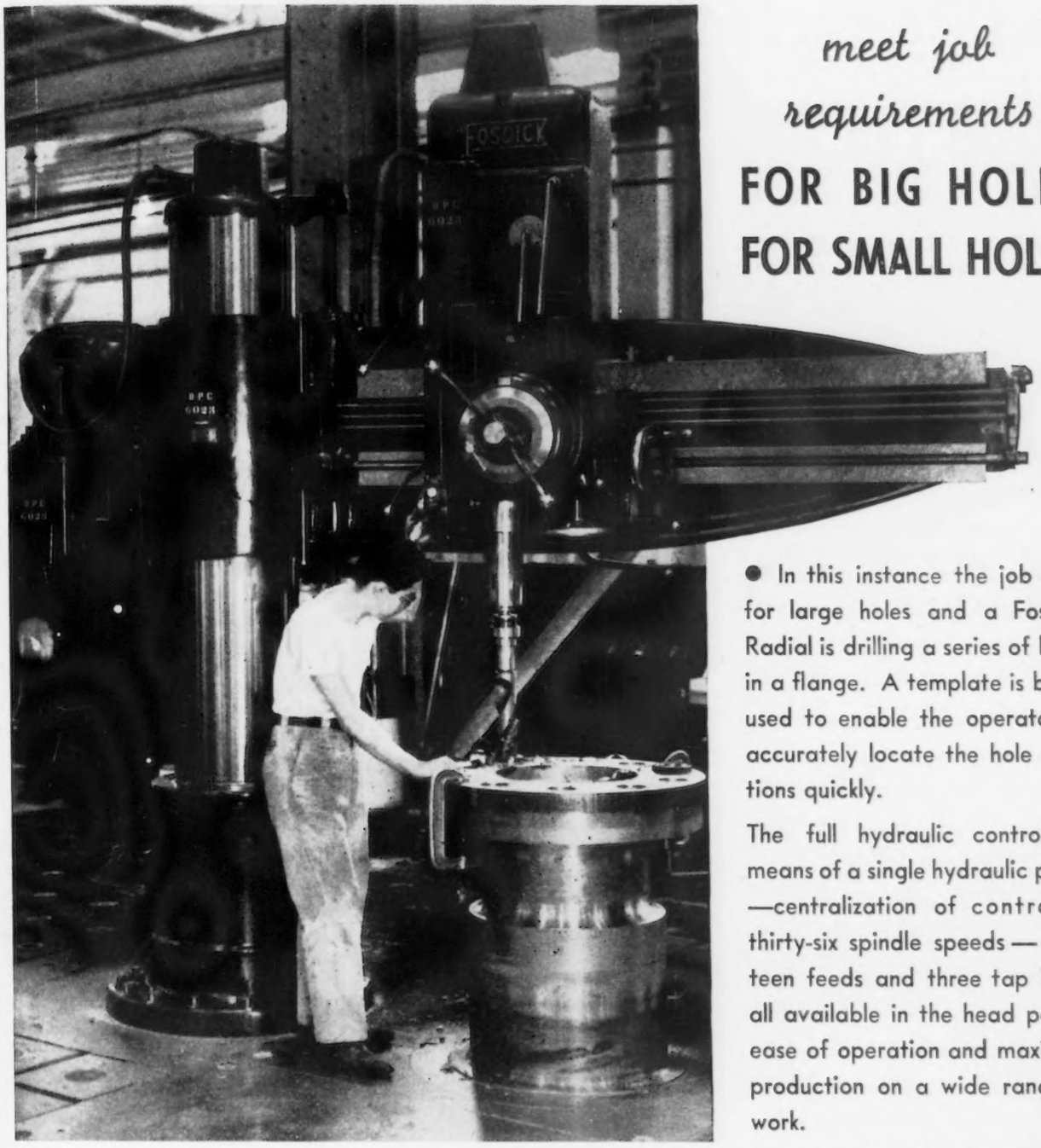
It is contended by traffic men that unless rates are raised losses will continue into the period when all shipping is handled by the shipping companies themselves. This month nine Victories are to be put in operation on the Coast and the profit and loss sheets will be closely watched.

Steps now being taken through the WSA to study the present rate structure and recommend increases, are being watched closely by all western businessmen and those in the iron and steel industry particularly. The present water rate on plates from the East Coast is now 50c per 100 lb and any material rise will probably be reflected in delivered costs here.

There is some conjecture as to whether U. S. Steel Corp. has such an increase in mind as it gives evidence of a renewed interest in Geneva. The reasoning of those who ponder is this: Columbia Steel Co., a subsidiary, has announced plans to put in a cold strip mill at Pittsburg and the belief has been that the coils for this operation would come from the East by water. Hence, if the water rate should become too high, it might be advantageous to be able to supply coils from Geneva. However, since the published rail rate for finished steel from Geneva to the Coast is 60c per 100 lb, either the water rate would have to increase more than 20 pct or a lower rail rate would have to be secured to make this phase of such an operation inviting even after sheet facilities not now available were working, say those who refuse to connect the possible rate increase with the corporation's interest in Geneva.

WHILE waves of speculation boil around in increasing violence as the date of bid opening approaches closer (unless the War

FOSDICK RADIALS



meet job requirements

FOR BIG HOLES
FOR SMALL HOLES

● In this instance the job calls for large holes and a Fosdick Radial is drilling a series of holes in a flange. A template is being used to enable the operator to accurately locate the hole positions quickly.

The full hydraulic control by means of a single hydraulic pump —centralization of controls— thirty-six spindle speeds — eighteen feeds and three tap leads all available in the head permit ease of operation and maximum production on a wide range of work.

If your work calls for a Radial put it on a Fosdick for speed— for accuracy—for economy.

FOR COMPLETE mechanical details write for Fosdick Radial Drill Bulletin R. D. I or consult a Fosdick representative on your radial drill problem.

FOSDICK MACHINE TOOL COMPANY
CINCINNATI 23, ··· OHIO

Assets Corp. again moves the date ahead) the Geneva plant remains unruffled by labor trouble or production worries. The 700 hourly workers affiliated with the AFL who agreed to an increase of 15c an hour instead of the 30c an hour requested are reported happy and are keeping the lone blast furnace, lime quarry and one battery of coke ovens in operation.

Of course, Henry Kaiser's interest and plans in regard to the Geneva plant continue to make news, but nothing of a definite nature has been forthcoming from his offices. Many local financiers are dubious about the fruition of the plan to form a large syndicate to purchase the Utah plant, but because Mr. Kaiser has so often done the unexpected no one in a responsible position is willing to state flatly that he can't or won't carry out the formation of a syndicate.

The Fontana plant of Kaiser Co., Inc., continues operations at near capacity rates and ground breaking for the $11,500,000 expansion program takes place this month. This program includes a Fretz Moon pipe mill to produce ½ in. to 4 in. butt weld pipe; alterations to present 36 in. breakdown mill to enable it to produce larger slabs; alterations to the present 29 in. structural mill to increase its range; installation of a cold strip mill which will be capable of producing strip from 16 to 31 gage in a maximum width of 20 in.; cold drawing facilities for finished bars up to 4½ in. diam. and a variety of other shapes; and construction of a mill warehouse.

The Kaiser-Fontana-Geneva jigsaw puzzle is further complicated by the addition of the piece labeled "Kaiser-Frazer Corp." It is established that this corporation will at least assemble cars in southern California — probably in the Long Beach plant of Douglas— and there is a strong belief among local industrialists that Mr. Kaiser is giving serious consideration to the source of his steel sheets if and when he begins stamping out his bodies in the West. There are many who believe he will produce them himself either at Fontana or, if the selected bidder, at Geneva.

Not to be ignored in the turbulent steel picture of the West, a group in Seattle is again seeking to establish a plant in the Northwest. Henry L. Lindahl is reported to be in Washington in an effort to borrow money from the government to help finance a plant reported to cost approximately $50,000,000 in its initial stage and approximately $100,000,000 when entirely complete. This program is following a pattern set almost 25 yr ago it is reported and considerable doubt has been expressed as to the availability of sufficient ore and coal to make the venture possible and whether a market could be found for its products.

Steel sheets may be scarce in the West, but San Francisco and Los Angeles dealers are being given another opportunity to buy aluminum sheets. A representative of a southern California company has taken up temporary headquarters in one of San Francisco's hotels and through advertisements in the daily papers has been doing a thriving business in 24-gage corrugated aluminum sheets in 6-ft and 10-ft lengths. Immediate delivery has been assured buyers. One of the more recent advertisements offers 200,000 lb of this material which the representative stated costs approximately three times as much as galvanized steel on a weight basis, but is only "slightly" higher on a per square foot basis.

* * *

LOS ANGELES — Washing machines and radio parts will soon flow from the aluminum extrusion plant operated during the war by the Bohn Aluminum & Brass Corp. for the Defense Plant Corp. The Harvey Machine Co. of this city and Long Beach has been granted a five-year lease by the Reconstruction Finance Corp. Rental will be based on a percentage of the plant's net earnings.

Built for the government at a cost of $8,000,000, the plant has a floor space of 375,000 sq ft and contains extrusion presses with a capacity of 11,700,000 lb annually. During the war it produced rods, tubes and bars, with a payroll of 1000 persons and it is anticipated that peacetime operations will involve approximately the same number of employees.

This is the first DPC aluminum extrusion plant west of Grand Rapids to be reopened as a civilian industry it is reported.

LIFETIME PREPARATION: *Two young students of a London trading school are working in one of the galleries of a model coal mine. They are being supervised as they learn the job of coal mining.*

The Bride Wore White . . .

An important marriage has taken place in one of Armco's steel mills. The shining ribbon of metal you see emerging from the machine is the result of that union. The bright beauty and rust-resistant properties of aluminum are wedded to the strength, usefulness and dimensional stability of sheet steel.

The new product is called ARMCO ALUMINIZED Steel.

Combining many of the advantages of the two metals in one easily fabricated sheet is a triumph of Armco research pioneering. After years of testing and experimenting a practical way was found to coat sheet steel with aluminum.

Proved in a number of important war uses, it is being used now in automobile and truck mufflers, oven liners, burner reflectors for electric ranges, combustion chambers for room heaters, and other products subjected to heat and to corrosion.

Armco research men and steelmakers are old hands at developing *special-purpose* iron and steel sheets. Coated steels and others are contributing to lower fabricating costs, and to longer life and greater attractiveness for sheet metal products of all kinds.

If you believe you could use aluminum-coated sheet steel, write us for samples of ARMCO ALUMINIZED. Just address The American Rolling Mill Company, 951 Curtis Street, Middletown, Ohio.

EXPORT: THE ARMCO INTERNATIONAL CORPORATION

The American Rolling Mill Company

ALUMINIZED ARMCO STEEL

Special-Purpose Sheet Steels

European Letter . . . JACK R. HIGHT

• AAF surplus in United Kingdom ready to be transferred to British. Reverse lend-lease material returned.

BURTONWOOD, near Liverpool, England—In the chill fogs of a typically British winter one of the giants of the war is dying. The passing, as normal as any monster's death can be, is nevertheless not without its spectacular aspects. All that remains here of the Army Air Forces' largest overseas supply depot is a warehouse of surplus government property. No longer the central supply center for the once mighty Eighth and Ninth air forces, hangars and warehouses are only partly full of miscellaneous equipment, most of which will be passed to the British in the near future.

The wartime history of the Burtonwood Air Depot covers both AAF and RAF occupation, recounts bombings on one occasion, hundreds of arriving and departing planes per day, thousands of engines overhauled per day, 16,000 GI's at work at one time, and the management of a satellite group of over 30 additional depots. A diary of a January, 1946, day will see a few more GI's leaving for home, a few straggling boxes of Air Forces surplus arriving for crating and storing, and perhaps a few cases of miscellaneous equipment shipped to Germany for the Occupational Air Force.

Aside from these activities, the base is the headquarters for half of the Air Forces surplus property that is in the United Kingdom. Here when VJ-Day put the torch to Pentagonal planning hundreds of American airplanes saw the axe. Destruction orders went out for P-51 Mustangs, P-38 Lightnings, B-17 and B-24 bombers and Douglas A-20's. Many of the aircraft were flown in from fighting bases for "Operation Sledgehammer," and the results of the job are to be seen in a scrap pile that is stacked high at one edge of the base.

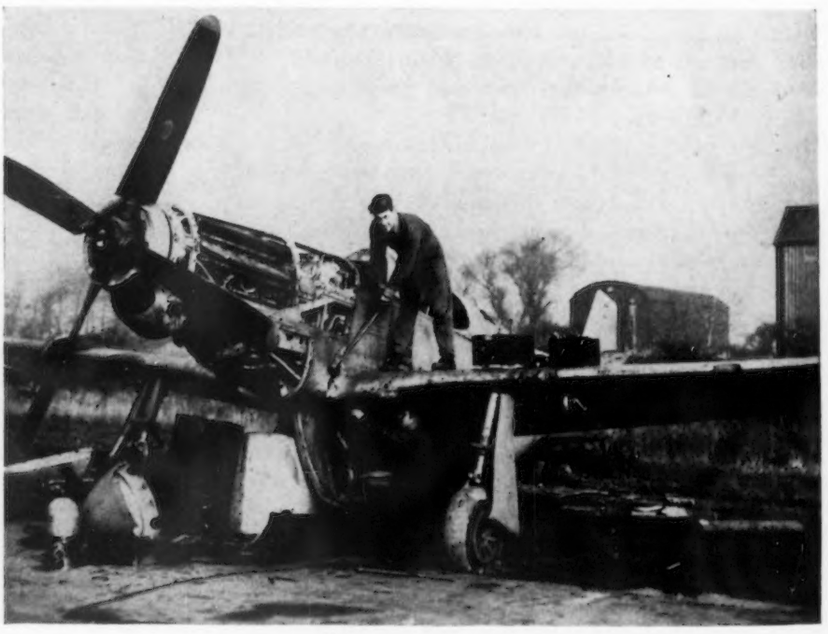
A rough segregation has been made of the aircraft scrap and conflicting views are heard from official and semi-official sources as to its destination. The Air Force view at the base is that the British Ministry of Supply has bought the material and that it has been delivered to them. At least it is certain that when part of the base was returned to the Royal Air Force the ground upon which the scrap is located was included, and the U. S. Air Forces considers the deal closed. London disposal authorities show some hesitation in the matter and indicate that there is a hitch in the proceedings.

Such a hitch is not surprising, inasmuch as the current plan is for the British to buy all U. K surplus from the Office of the Foreign Liquidation Commissioner when the loan is ratified, and there would seem to be little need to negotiate a special purchase for this material unless there existed an immediate need for it. It seems likely that the RAF will be in as favorable position as the AAF to furnish aircraft scrap to any buyer for the next few decades.

AMONG the ten hangars located here that are stacked with surplus supplies for ultimate disposal is one principally filled with aircraft photographic materials, aircraft radio and signal equipment, one with small hardware and airplane fittings, thousands of different types of modification kits, tool kits, hand tools, and others which could only be grouped under the broadest definition of miscellaneous. All of the equipment needed for equipping air fields is on hand in plentiful supply, and 2000 special purpose vehicles are lined up for return to the United States.

Cranes, truck-tractors, trailers, fuel trucks, fork trucks, tractors,

OPERATION SLEDGEHAMMER: *To provide clear sailing for the aircraft industry after the war, the Air Forces decreed death for many of the operational types of warplanes of the past war. P-51 Mustangs, pride of the air fleet, saw this fate with many others.*



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1. Survey and analysis of the lubrication requirements of your plant engines and machines.

2. Recommendations of proper lubricants, together with specific instructions as to when and how they should be used.

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SHELL INDUSTRIAL LUBRICANTS

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plows, traveling schoolroom and laboratories are included in the lists of vehicles that are to be returned for AAF needs in the U. S. Already shipped are 3700 vehicles of this type.

The aircraft ammunition and chemical warfare supplies which were on hand in the United Kingdom are being scuttled at sea as shipping is available to carry out the program, but the program has been somewhat delayed. About 55,000 tons of such material has already been added to the capital wealth of the Atlantic Ocean, and approximately 99,000 tons of ammunition and 35,000 tons of chemical warfare supplies are to be added. Representing 10,000 full freight cars, the ammunition is posing a serious problem from a rail transport angle as well as shipping.

As of the present time there are about 150,000 long tons of aircraft surplus supplies in warehouses in the United Kingdom, excluding the ammunition and chemical warfare supplies listed above. Most of this material is now located in two centralized depots, the one here at Burtonwood, and one located at Taunton. There are also 10 small ordnance holding points where some of the ammunition is located. A very approximate evaluation of the above material on the basis of its cost price would be in the neighborhood of a billion dollars.

An official estimate made on the basis of preliminary reports turned in last August called out 88,800 long tons of declared surplus at a cost price of $500,799,-073. It is now estimated on the basis of preliminary reports that there remains about 61,289 long tons of Air Corps surplus to be declared in the British Isles, and that the approximate cost price of this material was about $124,-776,826.

Of academic interest here at the Burtonwood depot is the presence of approximately three million board feet of Russian lumber which came as a part of the reverse lend-lease program, although this material has not been declared surplus. It is declared essential for the occupational Air Force, and much of the store that was here has been shipped to Germany. The material came from Russia in rough form, and the Air Forces set up a mill to plane, tongue and groove it for crating use.

WHITHER SCRAP?: *Mystery of the week in England is the supply of aircraft scrap resulting from the keelhauling of hundreds of operational aircraft. Air Forces officials say, "We sold it to the British Ministry of Supply." Disposal authorities have their doubts as to the outcome of the transaction. At present it seems to be more or less abandoned.*

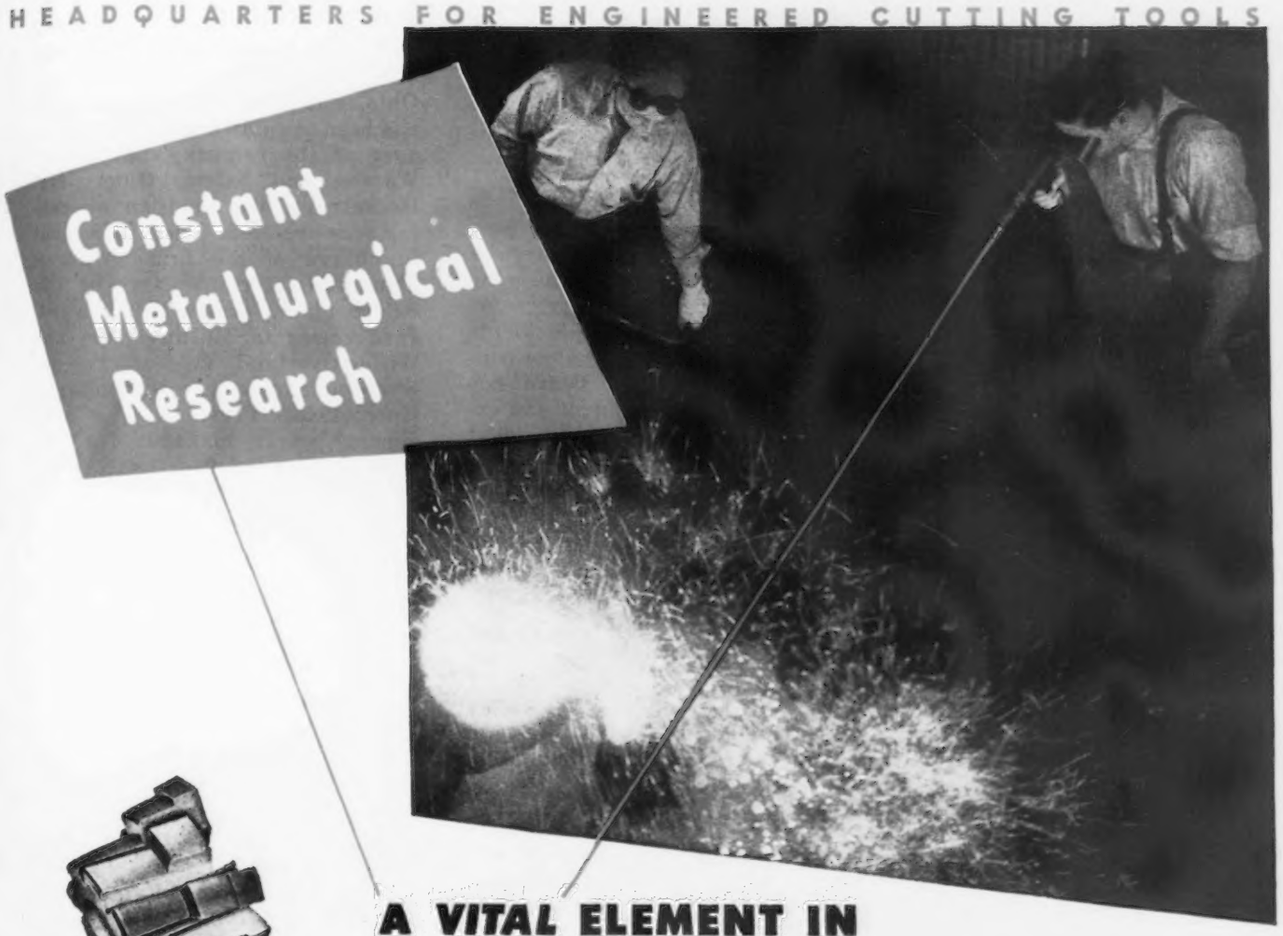
ALL U. S. Army surpluses in the U. K. excepting Air Forces material are being kept in common warehouses, of which there are now five large units. There are also a number of smaller holding points which are being used, but the material has been concentrated as much as possible. The overall amount of both general Army and AAF surplus has been greatly reduced by the return of all reciprocal aid material furnished by the British to them. This was one of the first steps in the process of handling the material and has been virtually completed.

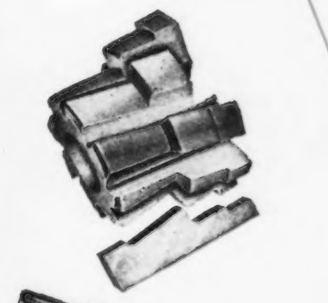
Large tonnages of many standard types of equipment, maintenance supplies, tools, raw materials supplies for repairs of aircraft and automotive equipment, and building supplies were furnished by the British under "reciprocal aid," or what was called "reverse lend-lease" in America. The cost of this material was deducted from the lend-lease balance, and is being knocked off the reverse total as it is returned. The overall estimate of the amount of this material to be returned was prepared late last year to be used as a factor in the loan agreement and final settlement of lend-lease.

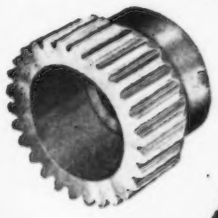
Both commercial warehouses and British Army depots are being used to handle regular Army surpluses, but much of this material is remaining in the open. That which is stored out of doors has been processed with taping and cosmoline for indefinite storage. The Army estimates that about 11 pct of the material, excluding AAF material, is stored under roof. The official position in the matter is that adequate roofed storage is being used and that no more is needed.

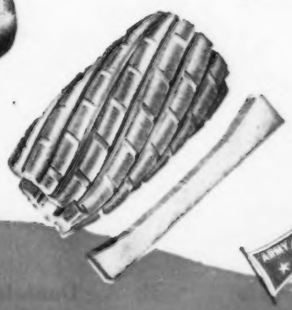
Some fear is being felt that if the arrangements for the bulk transfer of the American surplus located here to the British is delayed for several months there may be a shortage of manpower to protect the supplies. Although there was a tremendous drop in the numbers of men in use as depot troops in the last half of 1945, the decrease has now tapered off considerably, and if the loan is ratified in the near future, and the bulk sale is consummated, then the manpower question will not become too critical. British civilians are being hired as they are available to take over the job and may relieve some troops. The regular army supplies are being handled widely by German prisoners of war, who take care of many of the inventorying duties, and routine boxing and crating of supplies.

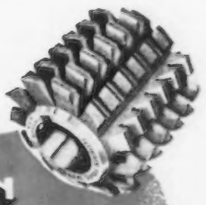
HEADQUARTERS FOR ENGINEERED CUTTING TOOLS











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PERSONALS

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• **William G. Pinkstone,** formerly vice-president of the West Co. of Philadelphia, has become vice-president of General Grinding Wheel Corp., and executive vice-president of West Abrasives, Inc. of Philadelphia.

• **Alexander H. Gaal** has been appointed merchandising manager of the Earle M. Jorgensen Co., steel distributors, with warehouses in Los Angeles, Oakland and Houston. A discharged Army major, he has been stationed for over 3 yr in the Steel Div. of the WPB, Washington. During 1943 he accompanied Sir John Duncanson, steel controller for Great Britain, on an extensive steel survey throughout the British Empire at which time the CMP plan was installed in Australia, New Zealand, India and Union of South Africa. Prior to his service in the Army he was with Republic Steel Corp., general sales, Cleveland, and also represented them in Los Angeles for several years.

• **Ellsworth H. Sherwood** has been made New York and New England district manager for National Malleable & Steel Castings Co.'s Railway Sales Div. to succeed **Charles Gaspar,** retired. He will make his headquarters in New York. **Floyd Snyder,** associated with the New York sales office since 1911, has been made sales agent at that office, and **George F. Wilhelmy** has been made sales agent in the Railway Div.'s Cleveland office.

• **Gerald R. McClure,** office manager of the Johnson Steel & Wire Co. at Worcester, has been made general manager of the company's Los Angeles plant to succeed George G. Johnson. Mr. McClure has been with the company 17 yr.

• **S. P. Flenniken, Jr.** has been appointed manager of the office equipment sales for the Berger Mfg. Div., Republic Steel Corp., Canton, Ohio. He started with Berger in 1937 as district representative in the Harrisburg, Pa., territory. In 1939 he was appointed district manager of the Indianapolis branch which he headed until 1942, then in the same year he took over the Chicago office as branch manager.

• **Walter W. Ross,** formerly with Chrysler Corp., has joined Metals & Plastic Engineering Co., Detroit, as chief engineer.

• **K. C. Gardiner, Jr.** has been elected vice-president in charge of operations of United Engineering & Foundry Co., Pittsburgh. At the same time, two vice-presidents have been given additional responsibilities. **Geoffrey C. Beard** has been named vice-president and executive assistant to the president and **William Hagel** has been named vice-president in charge of sales. Mr. Hagel was formerly vice-president in charge of machinery sales.

• **Roy A. Schimpf** has been named utilities engineer in charge of all work related to power, gas, steam and water, at all Timken Roller Bearing Co. plants.

• **James McWhirter** has been named superintendent of Pennsylvania Salt Mfg. Co.'s Natrona, Pa. plant. Mr. McWhirter, who succeeds Charles G. Boone, came to Pennsalt last summer after 8 yr experience in the heavy chemical industry.

• **Curtis H. Carr** has been elected vice-president of the Universal Tool Co., Dayton. He joined the company in 1940 and has been sales manager for the past 6 yr. He was formerly with General Motors.

• **Oscar D. Nelson** has been made president and general manager of the Butler Mfg. Co., Kansas City, succeeding **E. E. Norquist,** one of the founders of the business in 1901, who has been elected chairman of the board. **F. A. Rufi,** who came with the company in 1909 and has been secretary since 1927, has been elected treasurer, and **Glen C. Speakman,** general sales manager since 1936, has been made a vice-president. C. C. **Crouch,** in charge of advertising and sales promotion, and **Roy S. Kemp,** credit manager, were re-elected vice-presidents. **John Nelson** was also re-elected vice-president and named a special representative of the company. **Darius Melcher** has been named manager of the Minneapolis division.

• **Harry M. Heckathorn** has been appointed executive vice-president of the Mullins Mfg. Corp., Warren, Ohio, and **Frank M. Beauregard** has been appointed operating manager of the company's plants in Warren and Salem, Ohio. Mr. Heckathorn has been an operating vice-president since 1938, first in charge of the firm's Warren plant and later in charge of the Salem plant, also. Mr. Beauregard comes to Mullins from the Willys-Overland Co. of Toledo, where he had been works manager since 1943. Previously he was general works manager for the Crosley Corp. of Cincinnati.

• **Benjamin H. Jones,** assistant vice-president of the National Screw & Mfg. Co., Cleveland, has been appointed to act as general sales manager of the company. **Charles W. Baker** has been appointed manager of technical sales and will be responsible for sales of aviation products, rosan inserts and studs, Lok-Thred products, Hi-Shear rivets, scrivets and other special products. **Harold W. Laganke** becomes manager of distributor sales. He will also manage sales of bicycle and juvenile spokes. **A. L. Murdoch** as assistant sales manager will be responsible for activities of the various district sales supervisors, and **Charles L. Kerr** has been appointed assistant sales manager with varied responsibilities including sales promotion, catalogs, packaging, price bulletins, complaints, special inquiries and territorial analysis.

• **Melvin C. Shaw** has been named manager of the blower and compressor dept. at the Allis-Chalmers Mfg. Co., Milwaukee, succeeding **John Avery,** who has resigned to become president of a blower corporation in Indiana. Mr. Shaw has been chief engineer of the department since 1935.

• **E. A. Daniels** and **E. O. Williams** have been elected vice-presidents of Victor Equipment Co., San Francisco. Ernie Daniels, formerly general sales manager, becomes vice-president in charge of sales, and Ed Williams, formerly district manager, with offices in Los Angeles, becomes vice-president and manager of the Southern California district.

• **Com. Russell J. Roberts** has been appointed assistant to the president of the Sterling Engine Co. at Buffalo, succeeding **Edward M. O'Connor** who has retired after 29 yr with the company.

• **Col. Joel G. Holmes** has been appointed chief of the Chicago ordnance district, succeeding **Col. John Slezak,** who has been released from active duty to return to the presidency of the Turner Brass Works, Sycamore, Ill. Col. Holmes has been assigned to the ordnance dept. since 1921. Col. Slezak was called to active duty with the Chicago ordnance district shortly after the Japanese attack on Pearl Harbor, and has served as district chief since June 1944. He has been associated with Turner Brass Works since 1930, and was elected president in 1939.

• **William G. Shipman** has been appointed by the Graver Tank & Mfg. Co., Inc. as plant superintendent at East Chicago, Ind. **H. G. Sharp** has been made general manager.

• **W. A. Finn** has been appointed export manager of Worthington Pump & Machinery Corp., Harrison, N. J., succeeding **George Gellhorn** who has accepted a position of general manager of C. E. Halaby, one of Worthington's industrial machinery dealers in Columbia, South America.

• **Dr. James G. Black** has joined Philips Laboratories, Inc., at Irvington, N. Y., and will be chief of the division of miscellaneous projects and analytical laboratories. **Carol M. Veronda** comes to Philips from the Naval research laboratory where he was occupied with radar work. In his new post he will be assistant engineer, microwave section. **Frank Grace** will also occupy the post of assistant engineer, microwave section. **George A. Espersen** has accepted the post of associate physicist, microwave section. He has been transferred from the Dobbs Ferry, N. Y. plant where he was Tube Div. engineer.

• **John A. Grass** has been elected president and treasurer of the York Corrugating Co., York, Pa., and **Sterling W. Kohler** has been elected secretary.

• **Stanley P. Watkins,** formerly manager of the market development dept. of the Rustless Iron & Steel Div. of American Rolling Mill Co., Baltimore, has been appointed to head the new development engineering dept., and **Thomas L. Moore,** who was manager of western sales, has been named assistant manager of the department. **Peter B. Kline** has been appointed assistant manager of stainless bar and wire sales. **George W. Clearwater** has been elected assistant treasurer of the American Rolling Mill Co. and has been named office manager of the Rustless Iron & Steel Div.

LT. ROBERT S. AITCHISON, in charge of advertising dept., Lindberg Engineering Co.

• **Lt. Robert S. Aitchison** has rejoined the Lindberg Engineering Co., Chicago, to take charge of the advertising dept. While in service, Lt. Aitchison supervised the production of various Navy training films including subjects on welding, silver brazing, radio, and radar.

• **E. Kenneth Hughes** has been appointed commercial manager of the Whitehead Iron & Steel Co., Ltd., Newport, England. Except for a period during which he was on loan to the Iron and Steel Control, he has been with the firm for 28 yr.

• **J. R. Strohm** is now Chicago district manager for Copperweld Steel Co. He had previously been chief metallurgist of the Forge Div. of Dodge Mfg. Corp.

• **Douglas Rader,** advertising manager of Lindberg Engineering Co., has resigned his position and will be associated with the Norman Press of Chicago in an executive capacity starting March 1.

• **J. F. Bechtle** has been appointed Wyatt Metal & Boiler Works representative for the New England States comprising New York, Pennsylvania, Delaware, Maryland and the District of Columbia with headquarters in New York City.

• **John A. Baldinger** has been appointed assistant sales manager of the Automatic Transportation Co., Chicago, division of Yale & Towne Mfg. Co. He succeeds **Robert M. Whitney,** recently named assistant advertising manager.

• **Thomas J. Watson, Jr.** has been promoted to the position of assistant to the executive vice-president of International Business Machines Corp., with headquarters in New York.

• **George D. Clark** has been appointed chief engineer of the Russell Electric Co., Chicago.

• **C. E. Cook** has been named manager to head the new Circuit Breaker Div. of the Aireon Mfg. Corp., Kansas City, Kans. He goes to Aireon from the Square D Co. of Detroit where he was field engineer and assistant sales manager.

• **K. W. Green,** manager of Exide's Railway Sales Div., has been appointed manager of the newly consolidated Railway & Engineering Sales Div., Electric Storage Battery Co., Philadelphia. Mr. Green, during the past 4 yr has been supervising the Engineering Sales Div. in addition to his duties as head of the Railway Div.

• **C. G. Pommer** has been appointed manager of General Electric Co.'s Ordnance Div., Schenectady, N. Y., succeeding **C. E. Clark** who will serve as consultant to the division.

• **Hugh Littell,** formerly manager of the New York branch office of the James Flett organization, salvage materials marketers, has been appointed supervisor of the company's agency Contract Sales Div. **Ira Miller,** formerly assistant branch manager at New York, has been named manager.

• **Lt. Col. Theodore R. Phalen,** recently discharged from the army, has been appointed Cleveland branch manager for the Kohler Co., Kohler, Wis.

• **Harold J. Eckmann,** factory manager and secretary of the Wisconsin Metal Products Co., Racine, Wis., has retired after 25 yr of service.

• **R. M. McGaughey,** former manager of the John Deere Co. Milwaukee office, has been elected general manager of the firm's main plant at Moline, Ill. He is succeeded at Milwaukee by **George C. Hepburn,** former division sales manager.

• **A. L. Atherton** has been appointed advisory engineer and **Fred C. Heyl,** manager of the quality control dept. of the E. Springfield, Mass., plant of Westinghouse Electric Corp.

• **L. W. Delhi,** who recently resigned as vice-president of Western Pipe & Steel Co. of California, has become a partner in the firm of Hunt, Mirk & Co., engineers and contractors of San Francisco. Mr. Delhi has been general manager of Western Pipe & Steel for 22 yr and during the past 3 yr was in charge of their shipbuilding program. His experience will be utilized in the engineering and construction of steam power plants, marine engines, and all phases of steam distribution systems, in which Hunt, Mirk & Co. specializes. **Thomas J. Benney** is senior member of the firm and has been active in the company since 1905.

FRANK R. MARKLEY, general sales manager, Sun Oil Co.

• **Frank R. Markley** has been appointed general sales manager of Sun Oil Co., Philadelphia. Formerly manager of the company's industrial products dept., he will serve as assistant to Mr. Eckert, vice-president in charge of marketing, in the conduct of all sales activities. **Maximilian H. Leister** has been appointed general manager of Sun's motor products dept. Mr. Leister, who has been acting general sales manager since 1942, will devote his full time to supervising the sale of all motor products, including Dynafuel, motor oils, tires, batteries and accessories, and the operation of service stations and all advertising. **Ray H. Anders** has been appointed to succeed Mr. Markley as manager of the industrial products dept. He has been assistant manager of the department since September 1944.

• **J. W. Brauns** has been appointed manager of General Electric Co.'s Industrial Haulage Div., Schenectady, N. Y. He succeeds **F. H. Craton** who is now assistant manager of the Transportation Divs.

• **Harold W. Roher,** until recently manager of transmitting tube sales for Westinghouse Electric Corp., has joined the sales staff of Machlett Laboratories, Inc., Springdale, Conn. Mr. Roher, in his new capacity, will be in charge of the renewal sales dept., responsible for the distribution of the company's radio transmitting, industrial and electro-medical tubes through resale agencies. In addition, he will administer the company's operation under its RFC agency agreement relative to the sale of surplus government electron tubes.

• **Morris D. Utley,** formerly president of the National Gas Furnace Co. of Providence, R. I., and the Industrial Furnace & Supply Co. of Pawtucket, R. I., has been appointed New England district sales manager of the Lithium Co., Newark. He will open regional offices in Springfield, Mass.

• **Lt. Robert Maynard** has returned to his position as export manager for Osgood Co. and General Excavator Co. of Marion, Ohio.

• **George M. Wentz** has been appointed industrial engineer and technical adviser of National Screw Machine Products Assn., Cleveland.

...OBITUARY...

• **Charles F. Chase,** chairman of the board of directors of the Berlin Construction Co., Inc., Berlin, Conn., died recently.

• **Rupert A. Nourse,** 72, chairman of the board of the Midland Co., Milwaukee, and former president of the American Malleable Castings Assn., died Jan. 21 after a long illness.

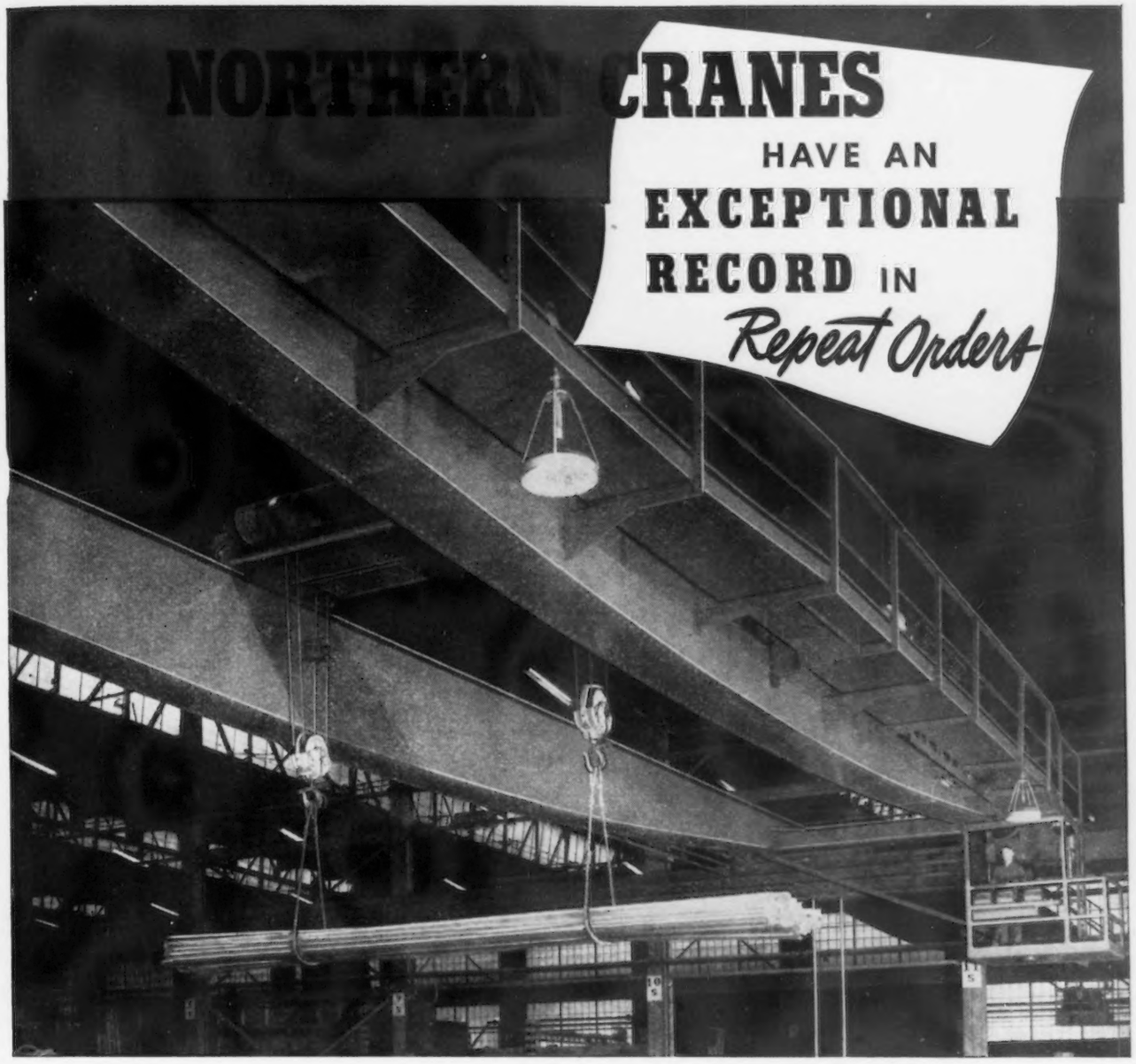
• **William Herman,** 82, former owner and president of the Fosdick Machine Tool Co., died Jan. 20 in Cincinnati. Mr. Herman retired from business in 1914 when he sold the Fosdick Co.

• **Elmer H. Neff,** head of the New York office of the Brown & Sharpe Mfg. Co. for 40 yr, died Jan. 26 at his home in Upper Montclair, N. J. Previous to entering the employ of Brown & Sharpe he had worked in various capacities in several plants in the West. In 1897 he was made manager of the firm's New York office, which position he held until his retirement in 1937, although he continued to serve in an advisory capacity until the time of his death.

• **Edward W. Baker,** 51, chief mechanical engineer for the Jefferson Union Co., died at his home in Lexington, Mass., Jan. 22.

• **Samuel H. Heller,** 73, secretary-treasurer of the Oilgear Co., until his retirement 2 yr ago, died Jan. 18 at Pasadena, Calif.

• **Joseph Blakeslee,** 63, who has been identified with the industrial engineering field for over 35 yr, died Jan. 21. He was associated with the Hendee-Connor Co. and the Buffalo Mill Supply Co. for many years before organizing his own firm in 1940.



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But Northern Cranes have built an exceptional record in repeat orders. A large proportion of our customers regard us as their prime source of cranes—reorder from us when new crane equipment is needed.

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AIR HOISTS • SPECIAL CRANES AND HOISTS

Dear Editor:

CASTINGS PRICES

Sir:

We have carefully looked over your 91st Annual Review issue of Jan. 3, but we don't seem to be able to find the exact price information which we need at the present time. On p. 210 you give composite prices of finished steel, pig iron and scrap steel, but in the manufacture of our product we use steel, iron, and bronze castings, steel forgings, plate steel and structural steel, and we are interested in getting information about the price trend beginning with the year 1938 up until the present time. While your composite of finished steel would more than likely take care of our plate and structural steel items, a considerable amount of work is involved between the pig iron as a product, and iron castings as a finished product.

CHARLES FARSCHT
Purchasing Agent
S. Morgan Smith Co.,
York, Pa.

● We haven't published any price data on trends in the ferrous and nonferrous castings field as there are so many intangibles involved in their production which affect the prices of castings, that it is well nigh impossible to follow trends accurately. However, you might communicate with the Bureau of Labor Statistics of the Dept. of Labor, Washington, and with the Dept. of Commerce in Washington to see whether they have compiled any statistics on this subject.—Ed.

WIRE DRAWING MACHINERY

Sir:

We wish to buy wire drawing machinery for our client in Shanghai, China. As we have not to date dealt in products of that sort, we beg of you to refer us to a number of manufacturers of above mentioned machinery.

PAUL E. SERNAU
20 W. 22 St.,
New York 10

● A list of several manufacturers has been sent you.—Ed.

ALUMINUM WELDING RODS

Sir:

We are seeking statistics in the use and consumption of aluminum welding rod used with the electric arc welding process. Do you have such figures available and will you inform us of the past and potential business in aluminum welding rod?

C. F. FREEDMAN
Vice President
American Agile Corp.,
Cleveland

● Figures on welding electrode consumption are compiled by National Electric Manufacturers' Assn., 155 E. 44 St., New York City. Perhaps they have a breakdown to show aluminum.—Ed.

LIME SPRAYS

Sir:

We are interested in obtaining the names of steel mills that use lime in wire drawing or in pig mold sprays. Will you be kind enough to recommend a directory which would give us this information?

W. R. CLIFFE
Consulting Engineer
L.I.M.E.,
Hershey, Pa.

● We do not believe any directory would enable you to make this particular separation in regard to mills using lime for the purpose you state. However, the Steel Works Directory published by the American Iron & Steel Institute, Empire State Building, New York City, and the Directory of Iron and Steel Plants, published by Steel Publications, Inc., 108 Smithfield St., Pittsburgh 30, both list all the steel mills and may be of help to you.—Ed.

SOFT-GRIT BLASTING

Sir:

In a recent issue of THE IRON AGE the possibilities of the following materials for blast cleaning were briefly discussed—Flak (clover seed), Nu-Blast (walnut shells), Agicide (apricot pits). We are interested in obtaining more information on these materials and wonder if you will be kind enough to let us know from whom this information might be obtained.

FRANCIS C. EVANS
Assistant Buyer
Remington Arms Co., Inc.,
Ilion, N. Y.

● The above mentioned materials were discussed in an article "Soft-Grit Blasting of Cylinders," by J. Albin, which was printed in the Nov. 22, 1945 issue. Flak is a product of the California Sun-Dried Boulgour Co. of Sacramento, Calif. For Nu-Blast, write to Control Engineering Co., and for Agicide, the Agicide Laboratories, Inc., both companies in Los Angeles.—Ed.

HOT PRESSING IRON POWDERS

Sir:

I would appreciate receiving from you a copy of your article "Hot Pressing of Electrolytic Iron Powders," which was in the Feb. 22, 1945 issue.

BERNARD P. PLANNER
Powder Metallurgy Corp.,
Long Island City, N. Y.

● Tear sheets have been mailed.—Ed.

ITALIAN MONTHLY MAGAZINE

Sir:

I represent a group in Italy organized to publish there a monthly magazine in Italian and condensed reprints of articles first appearing in leading American magazines selected as being of special interest to the general Italian public. This group is adequately financed and will have a skilled editorial and translating staff in Italy and in New York.

Please let me know if you would enter into agreements with this group giving it a call on reprinting rights to such of your published articles as it may from time to time select.

R. E. DESVERNINE
Garey, Desvernine & Garey,
New York 5

● Permission to publish occasional articles from THE IRON AGE is granted.—Ed.

MACHINERY INQUIRY

Sir:

We are interested in the purchase of machinery for cutting and straightening of 5/16 in. wire from coils. Could you kindly advise us of some manufacturers of this type of machinery?

H. S. HORN
Manhattan Ash Can Mfg. Co., Inc.,
New York

● We are sending you a list of several manufacturers.—Ed.

STAINLESS PRODUCTION

Sir:

I should appreciate receiving tear sheets on "Production Technique for Stainless Steels" which appeared on p. 76 of the Dec. 13 issue.

A. H. O'NEIL
Assistant to Vice President
Nicaro Nickel Co.,
New York 17

● Tear sheets have been sent.—Ed.

BLANKING PRESSURE

Sir:

We wonder if you can advise us as to where we can get a table which would give us the tonnage required at the bottom of the stroke to blank out a particular diameter in a particular gage metal.

JOSEPH FEIGENBAUM
Aaron Machinery Co.,
New York

● Believe that any press builder has information of this type for distribution.—Ed.

PRECISION CASTING

Sir:

Enclosed you will find U. S. money order in the amount of 60¢ and we would ask you kindly to forward a copy of your booklet "Precision Casting—Lost Wax Process."

M. A. R. KEHOE,
Secretary to Works Manager
Ontario Hughes Owens Co., Ltd.,
Ottawa, Canada

● Reprint has been forwarded.—Ed.

BERYLLIUM COPPER

Sir:

Please send me tear sheets of the following article which appeared in the Nov. 15 issue: "Surface Finishing of Beryllium Copper."

A. N. HORNE
Industrial Engineer
Acme Shear Co.,
Bridgeport, Conn.

● Tear sheets have been mailed.—Ed.

We'll lift the covers . . . IN MARCH

In this space, in March, we'll disclose three amazing new turning machines which Monarch has engineered expressly to meet rising production costs. However, if you'd like a quick "preview", we'll be glad to send you photographs and brief descriptions, immediately, with full details to follow the formal introduction. Write Dept. 203.

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This Industrial Week . . .

- **Complexities of Steel Prices Studied**
- **Government and Steel Continue Talks**
- **Steel Loss Reaches 4,500,000 Tons**

"COLLECTIVE bargaining" between the U. S. Steel Corp. and the government as to how much of a price advance shall be given for an 18.5¢ an hr wage settlement was gathering momentum this week. Whether or not this type of bargaining will have any more success than that between the steel company and the union remains to be seen.

The complex relationship between steel prices and prices of items made from steel is so intricate that to find a solution over the next few days seems unlikely. If the government, as now appears probable, has decided not to clean up the steel situation on an expediency basis, there is much more than a 50-50 chance that the steel strike will not be settled this week or next.

Chester Bowles is still a dominant figure in government price policies. He is reported to be reconciled to a steel price increase up to about $4.50 a ton, but would probably oppose anything beyond that figure. Unless his viewpoint is changed, a government-industry stalemate on prices may develop in view of the position taken by U. S. Steel that a price of much more than $6.25 a ton would be necessary to compensate for the 18.5¢ an hr increase plus past accumulated increases in steelmaking costs.

It is no longer believed that the steel price advance when it comes will be a simple across-the-board move for carbon steel products. Rather it is expected that the inequities between the prices of some steel products and others will be straightened out by a varying adjustment on some items. This method would also tend to alleviate the hardship which small nonintegrated mills have complained of on the basis that an identical advance on semifinished steel and finished steel products does not give them relief.

Several weeks ago when the government quietly offered a price advance as bait for a wage settlement, the disposition of many steel leaders was to put the soft pedal on conversation involving too much price "detail." This reluctance was apparently based on the feeling that the government might back down if it had to consider complex price relationships. Since those previous offers of the government failed to prevent the steel strike, it is expected that price conversations now will run the whole gamut of steel price relationships.

A settlement which might allow the bulk of the country's steel capacity to operate profitably might still leave a substantial number of smaller companies in the red. Refusal of most of these firms to accept premium ceiling prices has put the issue upon the basis of average industrywide costs. OPA's stern attitude is attributed partially to its difficulty in accepting an industrywide average which gives more efficient steel producers a comfortable profit in order to keep the less efficient ones in business.

The government, however, recognizes that all steel producers must keep in production if it is to prevent a stalling of reconversion. Furthermore, even after the steel strike has been settled it will be some time before steel deliveries reach their prestrike volume.

SOME companies are tentatively anticipating operating rates of as low as 50 pct of capacity for two or three weeks after the strike is settled. Despite precautions taken for maintenance of equipment, some damage has been caused by the shutdown. This must be repaired before full-time operations can be resumed.

It is estimated that by the end of this week steel lost because of the strike will amount to about 4,500,000 tons, or at the rate of about 1,500,000 tons a week. Since the resumption of steel output to prestrike levels after a settlement is made will take some time, it is already evident that reconversion has been set back weeks and possibly months.

Even consumers who have not fully used up inventories by the time a settlement is made may face a period during which no steel is received. Cold-rolled sheets require from four to five weeks to process in the steel mill and customers whose material is not on early schedules may have a long wait. Already customer pressure for preference on steel mill schedules after the strike is settled is growing by leaps and bounds.

One byproduct of the steel strike has been the elimination of steel shipments to Europe and to the Philippines for rehabilitation purposes. It is expected that the tentative allocation plans set up by the Civilian Production Administration for shipment of 850,000 tons of steel over the next six months to Europe will be drastically altered. So far no actual allocations had been made on steel companies but the directives were in the process of being issued.

Following a resumption of steel production in this country the pressure for deliveries from American consumers will be so great that plans for export steel must be held in abeyance for some time.

STEEL ingot output this week is estimated at 6.5 pct of rated capacity, down 0.5 pct from last week. Since there is no indication of an early settlement of the strike, it is expected that the rate next week will be no greater than 7 pct.

Steel workers so far, because of their long war grind, have looked upon the shutdown as more or less of a vacation, but with the strike winding up its third week this attitude may change. Up to this weekend, and considering only the basic steel industry and not steel fabricating and processing firms, the loss in wages since the strike began will be more than $45,000,000.

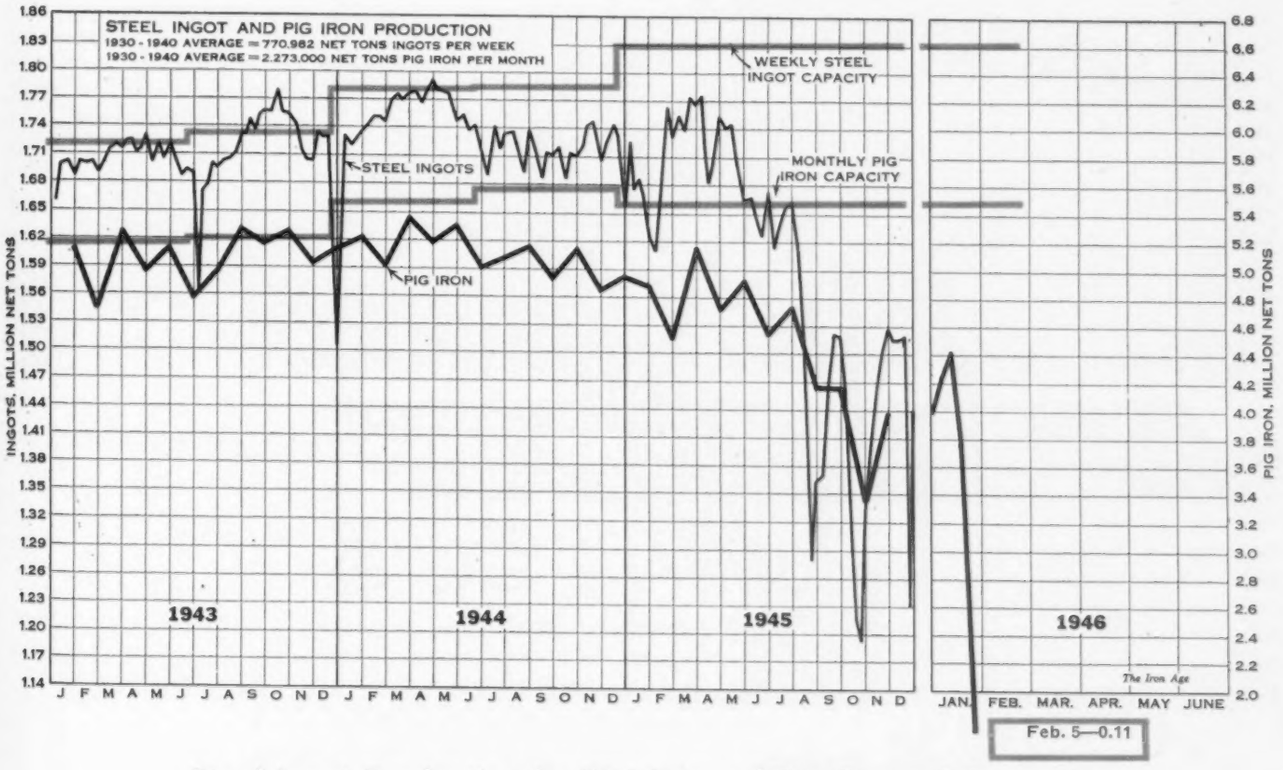
• **IRON AND STEEL SCRAP**—September figures covering production, consumption and stocks of iron and steel scrap and pig iron did not reveal any marked reactions to the end of hostilities in August, according to the Bureau of Mines. Stocks of iron and steel scrap at plants of consumers, suppliers and producers at the end of September 1945 approximated 4,708,000 gross tons, a decrease of 3 pct from the 4,848,000 tons reported on Aug. 13, 1945. Consumers' stocks on Sept. 30 amounted to 3,700,000 tons, compared with 3,772,000 tons on Aug. 31, while combined stocks of suppliers and producers were 1,008,000 tons and 1,076,000 tons on the same dates.

• **UNRRA PURCHASES ROLLING STOCK**—UNRRA has just completed the purchase of 3280 surplus U. S. railroad box cars and 920 gondolas to help re-establish the war-wrecked transportation system of eastern Europe, according to reports received from UNRRA's Surplus Procurement Office in Paris. Poland is to receive 2425 of the cars, Czechoslovakia 930, Yugoslavia 735 and Greece 110. The cars were secured through the Office of the Foreign Liquidation Commissioner in Paris. All are 20-ton prefabricated cars of American make. They were originally shipped in packaged parts, assembled in France and used for rushing war goods to the front during the campaign against Germany. They will be delivered as rapidly as they can be loaded with other goods already procured for the countries of destination. Anticipating the possibility of this purchase, UNRRA has delayed delivering 152 surplus U. S. Army locomotives now remaining of 200 secured in Belgium last month.

• **TOOL STEEL OUTLOOK**—Tool steel producers, until the steel strike, were operating at about 70 pct of melting capacity. They all recognize that stocks of tool steel are very high, and are a threat to future markets. Die steels are taking an abnormally large amount of the steel capacity of these manufacturers, and the market for these steels is one of the best outlets for tool steel producers. Tools in tool and blank form are stocked all over the country, with many tool fabricators feeling that stocks of material are better than money in the bank. With steel prices going up and with probable proportionate increases in finished tool prices, these fabricators with heavy stocks of tool steel blanks and tools should stand to save some money.

• **MILL EQUIPMENT OUTLOOK**—While many mill equipment plants are down because of the steel workers' union strike, most companies are planning for a big year in 1946. Chief holdup is said to be prices. Many would like to bid on jobs with an escalator clause on labor, but even if this were permitted about the only thing possible now would be to make a good estimate of the labor cost. In addition to new equipment a great deal of rebuilding is scheduled.

• **GENEVA LABOR CONTRACT**—Quietly without any fanfare Geneva Steel Co., operated by U. S. Steel for the account of the U. S. Government, has signed a contract with the AFL granting a 15c an hr increase in wages. The minimum common labor rate there has now advanced from 78c an hr to 93c an hr. Surprise in the move is the fact that the Geneva plant is government-owned and a wage increase less than the 18½c an hr advocated by Mr. Truman was agreed upon. This may have no significance, however, since it was up to the AFL membership to accept or reject any compromise offer on the original demand for a 30c an hr increase. The Geneva works which at one time employed about 5000 workers is now down to 700 workers with the company operating only one blast furnace and one battery of coke ovens. Steel production was discontinued on Oct. 12, 1945.


STEEL INGOT AND PIG IRON PRODUCTION
1930-1940 AVERAGE = 770,982 NET TONS INGOTS PER WEEK
1930-1940 AVERAGE = 2,273,000 NET TONS PIG IRON PER MONTH
WEEKLY STEEL INGOT CAPACITY
MONTHLY PIG IRON CAPACITY
STEEL INGOTS
PIG IRON
INGOTS, MILLION NET TONS
PIG IRON, MILLION NET TONS
1943
1944
1945
1946
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
JAN. FEB. MAR. APR. MAY JUNE
The Iron Age
Feb. 5—0.11

Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
January 29	3.0	8.5	0	2.0	0	0	52.0	0	25.0	14.0*	37.0	14.0	0	7.0
February 5	3.0	8.0	0	2.0	0	0	52.0	0	24.5	14.0	37.0	14.0	0	6.5

* Revised

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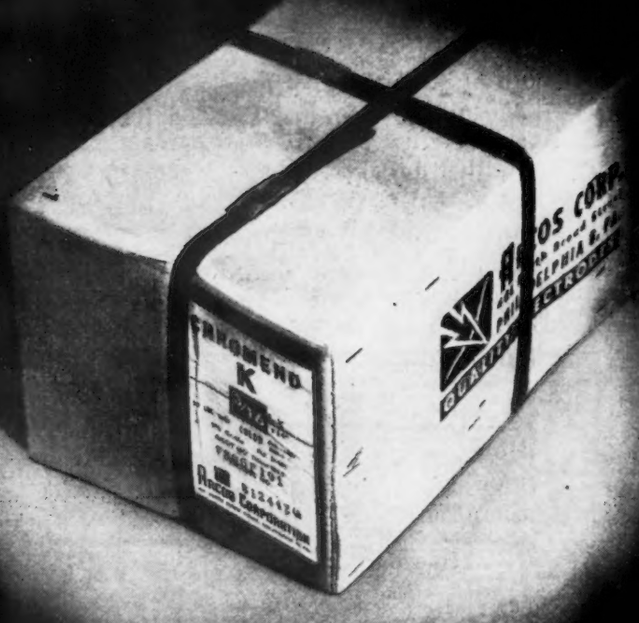

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Borger, Texas ..... Hart Industrial Supply Co.
Houston, Texas ..... Champion Rivet Co. of Texas
Kingsport, Tenn. ..... Slip-Not Belting Corp.
Knoxville, Tenn. ..... Slip-Not Belting Corp.
New Orleans, La. ..... The Gulf Welding Equipment Co.
Oklahoma City, Okla. ..... Hart Industrial Supply Co.
Pampa, Texas ..... Hart Industrial Supply Co.
Phoenix, Arizona ..... Arizona Welding Co.
Tucson, Arizona ..... Arizona Welding Co.
Tulsa, Oklahoma ..... Hart Industrial Supply Co.

MIDDLE WEST

Albuquerque, N. Mex. ..... Industrial Supply Co.
Chicago, Ill. ..... Machinery & Welder Corp.
Cincinnati, Ohio ..... Williams & Co., Inc.
Cleveland, Ohio ..... Williams & Co., Inc.
Columbus, Ohio ..... Williams & Co., Inc.
Detroit, Michigan ..... C. E. Philips & Co., Inc.
Ft. Wayne, Ind. ..... Wayne Welding Sup. Co., Inc.
Indianapolis 2, Ind. ..... Sutton-Garten Co.
Kansas City, Mo. ..... Welders Supply & Repair Co.
Milwaukee, Wis. ..... Machinery & Welder Corp.
Moline, Ill. ..... Machinery & Welder Corp.
St. Louis, Mo. ..... Machinery & Welder Corp.
Wichita, Kansas ..... Watkins, Inc.

WEST COAST

Bakersfield, Calif. ..... Victor Equipment Co.
Fresno, Calif. ..... Victor Equipment Co.
Los Angeles, Calif. ..... Victor Equipment Co.
Portland, Ore. ..... J. E. Haseltine & Co.
San Diego, Calif. ..... Victor Equipment Co.
San Francisco, Calif. ..... Victor Equipment Co.
Seattle, Wash. ..... J. E. Haseltine & Co.
Spokane, Wash. ..... J. E. Haseltine & Co.
Tacoma, Wash. ..... J. E. Haseltine & Co.

FOREIGN

Honolulu, Hawaii ..... Hawaiian Gas Products, Ltd.
Monterrey, N. L. Mexico ..... Electrodos Monterrey, S. A.
Montreal, Canada ..... G. D. Peters & Co. of Canada, Ltd.
Chile, Bolivia, Peru ..... W. R. Grace Company

Industry-Government "Collective Bargaining" May Hit Snag

By TOM CAMPBELL

o o o

New York

• • • **Whether or not** the "collective bargaining" on steel prices which is to take place between the government and the steel industry will be any more successful than that between U. S. Steel Corp. and the union recently remains to be seen.

Both the steel company and the government may have to back down on previous stands if Washing price increase reports are to be given credence. Latest reports indicate that OPA may allow as much as a rise of $4.50 a ton on steel items. It previously had balked at any more than $2.50 a ton rise even though other government officials had suggested about $4.50 a ton.

Benjamin F. Fairless, U. S. Steel president, and Irving S. Olds, steel corporation board chairman, are both on record that the price increase promise some weeks ago would allow the company to raise wages no more than 15¢ an hr. This promised increase, made over the telephone to Mr. Fairless by a high governmental authority, is believed to have been about $4.50 a ton. With this same figure bobbing up this week, it seems unlikely that a break in the steel wage impasse will be a pushover.

During the past week U. S. Steel executives including Mr. Fairless had spent considerable time in Washington, part of which was utilized completely reviewing the steel price problem. Furthermore it is believed that Mr. Fairless and other steel leaders have attempted to find out what if any plans are on foot for increased wage demands from the coal mines this April. To make a settlement now with the steel workers union only to be faced in April with a large coal mine worker pay demand would again leave the steel company behind the eight ball on additional costs.

HOMEWARD TREK: *More than* 25,000 *Ford Motor Co. workers, part of whom are shown going home here, are expected to be forced off their job this week because of the steel shortage. This is in addition to* 15,000 *workers laid off last week. If the steel strike lasts another week such layoffs will be common throughout the whole nation.*

o o o

On the labor side it is not expected that Mr. Murray will budge from his present position which includes an acceptance of 18.5¢ an hr wage advance or a continuation to the bitter end of the steel strike. Many steel workers so far have looked upon the strike as a well-earned vacation, but this attitude is expected to change if the strike goes into its fourth week.

Having more or less agreed with the stand taken by the steel companies in the beginning, depletion of steel inventories is expected from here on out to result in heavy pressure upon the industry from consumers to "do something." As long as steel users were able to operate from their supplies, the full significance and seriousness of the steel strike was not entirely clear.

According to reliable steel sources a clarification of the steel price controversy within the framework of an anti-inflation program is anything but simple. Considerable time would be necessary to study the proper amounts which individual steel products should be advanced in order to create an economic balance between the various items. An across-the-board increase in prices, the steel industry insists, would further harm the small nonintegrated producers and would continue the inequalities which now are said to exist with respect to some products.

OPA Sees Steel Price Rise Affecting Stable Price Pattern

Washington

• • • **Price increases** in steel, no matter what the degree, will mean a higher price level throughout the national economy. This is made clear by the fact that a boost in a key industry like steel means a new wage-price structure has been established under the terms of the stabilization act, according to OPA sources. While the present price level will be pushed upward, theoretically, OPA's standard of allowing 1936-1939 average earnings to reconverting manufacturers will be left unchanged. However, with steel price and wage increases, similar rises will percolate through consuming industries, whether they make refrigerators or tractors.

The reason for this spreading of price and wage increases is that OPA will be committed to applying the pattern that is set for the steel industry to the whole national price system. This tying together by the Administration of simultaneous price and wage increases, considerably weakens the position of unions other than USW. For example, UAW, has strongly opposed price rises in its negotiations with General Motors.

Effective Feb. 5, under OPA regulations reconverting manufacturers would be required to absorb steel price increases unless such absorption would cause "hardship impeding reconversion," as outlined in the Nov. 28, 1945 directive of the stabilization administrator. The regulations also provide that after that date no wage increase shall be considered in setting prices, unless failure to do so would cause "hardship impeding reconversion." The quoted phrase is the "legal out" for granting price increases based on higher wage and greater steel costs for users.

In addition, large reconverting manufacturers no longer have to show that they are operating at a loss before they can ask for price adjustments nor will they be forced to show that their production is less than 50 pct of normal peacetime output, as had been previously required.

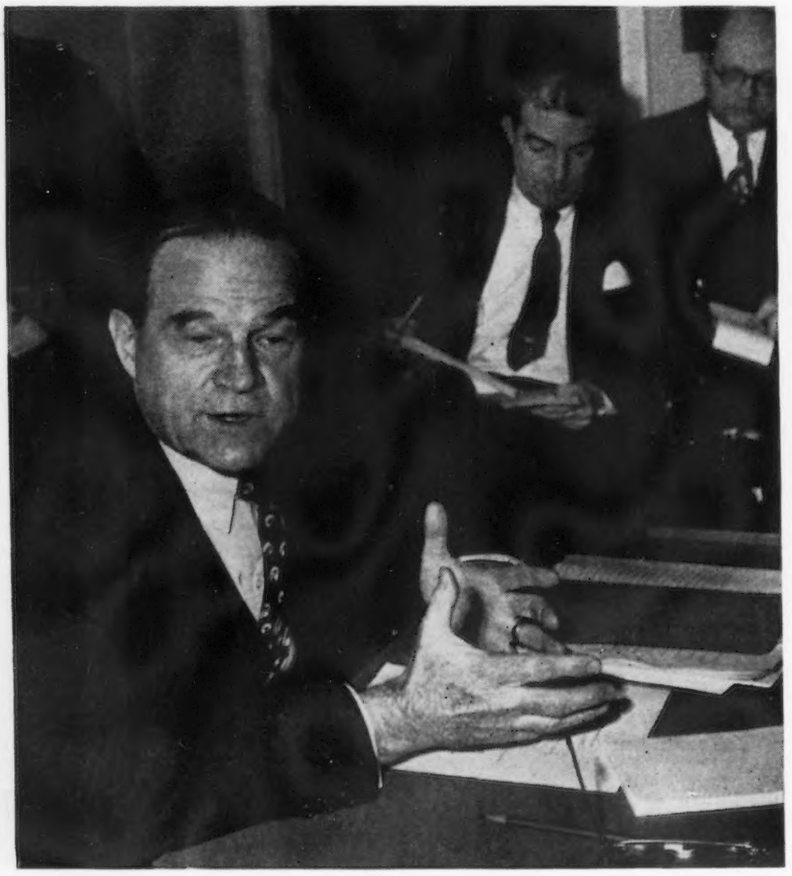
It is safe to assume that contractors and fabricators could pass on steel price increases because they operate under a cost plus regulation which has been in effect for a prolonged period.

Early in the week price administrator Chester Bowles was represented to be reconciled to a steel price increase up to $4.40, but that beyond such a level, all price control would be knocked into a cocked hat. So fixed is Bowles said to be in the view that a new price level could not be set and held if it exceeded this figure that he is prepared to resign if overruled by the Administration. Previously Mr. Bowles held out for a steel price increase of not more than $2.50 a ton to cover current costs, and now estimates that wage demands could be absorbed by an additional boost of $1.90 a ton.

It is OPA's position that 1945 fourth quarter operations were not representative of normal conditions and therefore financial returns for that period do not fully support the steel industry's claims for price relief.

Whatever the amount of the price increase, it will not be an across-the-board advance. Rather there will be varying boosts on carbon products only.

EXPLAINING: *Irving S. Olds, U. S. Steel Corp. chairman, last week clarified his previous remarks by pointing out that the steel corporation not only required a price advance to take care of any current increase granted, but was also entitled to an additional adjustment for past increased costs.*



Carpenter Earnings Up

Reading, Pa.

• • • **Carpenter Steel Co.** fourth quarter earnings after $563,600 provision for estimated taxes and $59,823 applicable to prior years, totaled $357,621. Net income for final quarter of 1944 was $224,056.

Wage Increase of 18½¢ Viewed as Threat To Life of Small Plants

Pittsburgh

• • • **Regardless of** what agreement may be reached by U. S. Steel and other basic steel companies with the steelworkers' union, a large percentage of 350,000 steelworkers striking in steel fabricating plants may remain out of work for a long time or be permanently out of a job, according to the Tristate Industrial Assn., on the basis of reports from 56 strike-bound steel-using companies employing more than 50,000 in the Pittsburgh district. The dilemma faced by these companies is the same that confronts 700 others with 350,000 employees in the nation.

"The plants that use steel in their manufacturing operations must buy their steel from the big steel-producing companies and the CIO-USWA persists in classifying the smaller companies in the same category with the larger ones," Ray Booth, secretary, stated. "Therefore, our members are caught in the middle between a steel price increase and wage increase demands which many of them cannot meet."

"In the meantime, there is no relief in sight for the prices of the products of these companies, such as forgings, castings, machinery, pipe, water tanks, radiators, refrigerator parts and similar items manufactured of steel. Most companies have been losing money consistently on these peacetime products, even without an increase in the price of steel and wage rates.

"It is absolute folly to expect these steel-using companies to settle with the union for 18½c when they do not know—and have been unable to find out—just how much steel prices will be increased and whether they will get relief on the prices of their products. Even if OPA does take the price problems of these relatively small firms into consideration, it may require months to adjust prices because of the multiplicity of items manufactured.

"In the meantime, some of them report that they will have to stay closed or go out of business permanently when U. S. Steel and other large corporations settle their dispute with the union, because the union refuses to discuss any wage increase other than 18½c — the same demand made upon. basic steel."

The association has led a movement to induce the CIO-USWA to negotiate individually with each company as the basis of its own individual situation. "While Philip Murray, union president, has declared publicly that the union will negotiate individually with these companies," Mr. Booth asserted, "those few who have been contacted in the past few days all report the same story. The union representatives will talk about nothing but 18½c per hr, regardless of what amount the firm may be able to pay or offer. Most of the union's 'bargaining agents' say they have orders from headquarters to negotiate on the basis of 18½c or nothing. This is definitely not collective bargaining."

Pointing to a specific instance of the union's refusal to bargain collectively, in the true sense, the association declared that the West Penn Machine Shops, Inc., Pittsburgh, had been contacted by a union negotiator whose negotiations consisted only of an ultimatum of 18½c. "What is going to be done with companies like ours who cannot meet that wage increase," Russell asked the representative.

"You'll just have to go out of business," was the reply. The representative also informed Russell that the 18½c figure had been set by the union's national poilcy committee and that the locals had no alternative or authority to talk about anything else.

William O'Brien, president of the O'Brien Steel Construction Co., Washington, Pa., received a letter from Louis Tomayko, director of District 13, CIO-USWA, informing him that the union was ready to "resume collective bargaining with this new figure (18½c) as the determining factor."

"We cannot meet that price," Mr. O'Brien said, "and in view of the union's attitude we have closed down our plant completely."

o o o

TOUGH ROAD AHEAD: *The steel fact-finding board shown here may have their hands full this week when a final White House steel settlement proposal may be forthcoming. So far the board has studied only governmental data, and if recommendations are made only on that basis they are expected to be inconclusive. Left to right are: Roger I. McDonough, James M. Douglas and Nathan Feinsinger.*

o o o

Plans Overall Increase

Detroit

• • • **Virtually all** employees of the Ford Motor Co. not covered by the recent 18¢ an hr agreement between the company and the UAW have been awarded a wage increase of 15 pct effective as of Jan. 1. Approximately 19,000 hourly and salaried people are included.

The overall plan for the increase will be presented to employees represented by other labor organizations through their authorized representatives, it was said by company officials. One phase of the plan contemplates transfer of 4335 foremen from hourly to salary rolls.

Steel Strike to Interfere With Allocations for Foreign Countries

. . By TOM CAMPBELL . .

New York

• • • **A small but important** by-product of the nationwide steel striken in this country is the holding up of rehabilitation in Europe and in the Philippines. All shipments of steel to these countries have been stopped and plans of the Civilian Production Administration for specific steel allocations abroad may have to be drastically changed.

A few months ago it looked as if the steel industry might be forced to ship as much as 4 million tons of steel abroad. Later, however, the CPA made tentative plans to allocate 840,000 tons of steel among the various companies for shipment abroad over the next six months. So far it is understood that no actual allocations upon the steel companies have as yet been made.

It is believed that on one of his recent visits to Washington Mr. Fairless, U. S. Steel president, made it plain to proper governmental officials that government sponsored steel export programs would be substantially affected by the steel strike. It is logical to believe also that shipments to Europe and the Philippines will be delayed and possibly curtailed for several weeks after the steel strike is settled.

On regular export steel orders —those which are not involved in governmental allocations — purchasers have been instructed to extend their letters of credit. It is understood that they have been informed that orders already placed will remain on the books but that actual shipment will depend upon the speed with which American steel mills resume operations.

The outlook for fulfillment of the expected 840,000 tons of steel allocations to be directed by the CPA does not present as bright a picture as for regular contractural exports. When the steel mills begin to produce again, the clamor for steel products from domestic users who are in the advance stages of reconversion will be so great that to divert any of this material for European rehabilitation would meet with strong opposition.

Such an opinion, however, is believed to encompass only the immediate period after the steel strike settlement. Many sources in this country are of the strong opinion that steel must be shipped abroad and Europe must be rehabilitated if a prolonged return to normal is to become a fact in this country.

The major point of issue on the enforced supplying of steel to Europe has been the view that until reconversion in this country has made substantial progress, it would be useless to send material to Europe. It is believed that this viewpoint was responsible for the substantial revision in the total allocation of steel for export which at first was talked about in terms of 4 million tons and was later drastically reduced.

With the steel industry already well into its third week of a nationwide strike, with blast furnaces and openhearths cold, and with the necessity for substantial maintenance and rehabilitation work after the steel strike is settled, it is doubtful if steel export shipments can resume their prestrike volume for at least several months after the steel impasse has been broken.

Takes Over Iron Foundry

Chicago

• • • **Operations of** the Waukesha, Wis., malleable iron foundry of General Malleable Corp., Waukesha, Wis., have been taken over by International Harvester Co. and negotiations for its purchase are underway according to R. P. Messinger, Harvester vice-president. Aluminum and gray iron foundries owned by General, both at Waukesha, are not affected. Malleable castings long have been a bottleneck in truck and farm equipment production.

SHORT LIVED: *The improvement gained during November and December in pig iron production following the coal strike in October has already been snuffed out by the nation-wide steel strike. Practically all blast furnaces in the country with a few exceptions are idle and resumption even after the strike is settled may take some time for many of the units.*

Blast Furnace Capacity and Production—Net Tons, Source: American Iron & Steel Inst.

			PRODUCTION							
			PIG IRON		FERRO-MANGANESE AND SPIEGEL		TOTAL			
	Number of Companies	Annual Blast Furnace Capacity	December	Year to Date	December	Year to Date	December	Year to Date	Pct of Capacity December	Pct of Capacity Year to Date
DISTRIBUTION BY DISTRICTS:										
Eastern	12	12,988,970	741,373	9,646,357	15,649	333,897	757,022	9,980,254	68.8	76.8
Pittsburgh-Youngstown	15	25,904,240	1,767,677	21,455,015	14,040	234,171	1,781,717	21,689,186	81.4	83.7
Cleveland-Detroit	7	6,589,500	436,370	5,462,690	.....	.....	436,370	5,462,690	78.1	82.9
Chicago	7	14,070,510	921,457	11,493,511	.....	17,299	921,457	11,510,810	77.3	81.8
Southern	8	4,924,670	300,008	3,754,821	5,924	126,843	305,932	3,881,664	73.3	78.8
Western	4	2,836,000	120,498	1,642,478	.....	.....	120,498	1,642,478	50.1	57.9
TOTAL	37	67,313,890	4,287,383	53,454,872	35,613	712,210	4,322,996	54,167,082	75.8	80.5

Unions Pick Off Farm Machinery Builders Individually

Chicago

By CHARLES T. POST

o o o

• • • **Past, present,** and pending strikes in the farm equipment industry consist of a series of unrelated actions against individual manufacturers with the equipment-hungry farmer the only sure loser.

The disputes are enlivened by a sharp rivalry between the United Farm Equipment & Metal Workers and the United Auto Workers, both CIO unions with occasional by-play from the United Mine Workers District 50 and other AFL groups.

Any agreement reached in the spectacular strike since Jan. 21 of the Farm Equipment Workers at ten plants of International Harvester Co. will have only limited effect on negotiations with other firms. Although the Harvester Co. is the largest farm equipment manufacturer, other companies will be guided more by local situations than Harvester's lead, and union tactics must be strongly influenced by the varying status of rival labor organizations.

Neither company nor union is committed to venture further into the no-man's land lying between Harvester's 17c. per hr wage boost offer and the Farm Equipment Workers' revised demand of 19½c., but both are cooperating with a federal fact-finding panel. Average weighted base wage in the affected plants was $1.14 per hr as of September 1945, according to the company. The union originally demanded a 30 pct general wage increase. Paradoxically, International's steelmaking division, the Wisconsin Steel Works at Chicago, has an independent union and is not on strike. Its truck plants and a farm equipment plant at Canton, Ohio, represented by the United Mine Workers, District 50, likewise are not affected.

The Farm Equipment Workers also have closed the South Bend, Ind., plant of the Oliver Corp. Five other Oliver plants, involved with other unions, still are operating, but are hobbled by steel, electrical and ball-bearing strikes. Work at the company's Cleveland track-laying tractor plant has been most sharply curtailed, and materials and supplies will dwindle out at the other plants by the end of this week, it is expected.

At J. I. Case Co. plants, United Auto Workers locals delayed a strike scheduled for early December in order to collect a bonus of approximately $1,225,000 distributed Dec. 22, celebrated the Christmas holiday, then walked out Dec. 26. The company continues to look askance at a demand for a 30 pct wage increase, but the goodwill engendered by the bonus shows signs of paying off. A back-to-work movement has gained such momentum at its Rock Island, Ill., plant, it declares, that operations have been resumed and production is picking up.

Case's Racine, Wis., neighbor, Massey-Harris Co. continues uninterrupted operations, hampered only by materials shortages. Massey-Harris signed an agreement with the United Auto Workers in October, retroactive to March, and thus has a short breathing spell before facing new demands. By that time, settlements effected with other companies by the union should hint a basis of settlement.

Deere & Co. plants have their strikes behind them, and probably are less affected by suppliers' strikes than other firms because of a relatively high degree of integration, and materials piled up during the strike period. The United Auto Workers, who bargain for four Deere plants, and the Farm Equipment Workers, who represent employees at a fifth, ganged up for a long tie-up last fall when the company was still supplying machinery and repairs for the farm harvest. The UAW settled Nov. 5 after stoppages lasting up to 10 weeks, while the UFEW held out at the John Deere Plow Works for 14 weeks. General terms of settlement embodied a 10 pct raise with retroactive features.

A similar inter-union action is in prospect for Allis-Chalmers Mfg. Co., where the United Auto Workers, the Farm Equipment Workers, and the Radio, Electrical & Machine Workers, all CIO, are

PROBABLE DELAY: *Rehabilitation and reconstruction of war torn Europe will be directly affected by the steel strike in the United States. Projects like this rebridging of the Po River in Italy will probably have their completion schedules substantially altered. Shipments of steel to Europe have almost completely ceased and resumption will depend upon the length of time it takes American steel mills to regain pre-strike levels after a wage accord has been reached.*

laying joint plans to stop production of the company's widely varied products at plants at West Allis, Wis., near Milwaukee, Pittsburgh, Boston, LaPorte, Ind., Springfield, Ill., Norwood, Ohio, and LaCrosse Wis.

The Farm Equipment Workers called out 16,000 employees at Peoria, Ill., plants of Caterpillar Tractor Co. Jan. 29 following a turn-down on a 30 pct wage demand. Some of the company's track-laying tractors are used in agriculture in the Far West, but the balance of its output is industrial.

A long tie-up in the farm equipment industry would be particularly serious because production schedules are geared to the seasonal needs of agriculture. Failure of seeding equipment, for instance, to be ready for the planting season, would render it of little value for a full year. Lack of repair parts, which constitute about a third of total output, could cause serious agricultural complications.

Flow of Tubs, Motors, Castings For Washer Industry Hit by Strikes

Chicago

• • • **Production of** washing machines and ironers, never above a snail's pace since the war, took two hard blows almost simultaneously with the steel and electrical strikes.

Civilian Production Administration estimated that 65,000 domestic washing machines and ironers were shipped in December, about 40 pct of monthly prewar output. This probably represents a peak since VJ-Day. January production, manufacturers say, was at about 30 pct of prewar levels at plants in this area.

The washing machine industry is essentially one of assembly of components received from other manufacturers. Few firms have large storage facilities, and consequently a break in supply of components is quickly reflected in final assembly operations.

Tubs, motors, castings and wringers have constituted headaches of varying intensity in recent months. Enameling sheets, one of the tightest of all steel products, have kept tub manufacture low. The strike at the Geuder, Paeschke & Frey plant, Milwaukee, in effect since last August, has virtually cut off the tub supply for at least two manufacturers.

Manufacturers have been receiving tubs produced from steel received before the steel strike, but the stream is expected to become only a trickle this week. A break in the flow of tubs is virtually certain whether or not the steel strike is settled because tub producers, using inventories down to the last pound, will have to await receipt of more steel from the mills.

A similar delayed effect is expected to be felt through the break in receipt of electric motors. Most washing machine manufacturers entered the strike with about a two week supply of motors on hand.

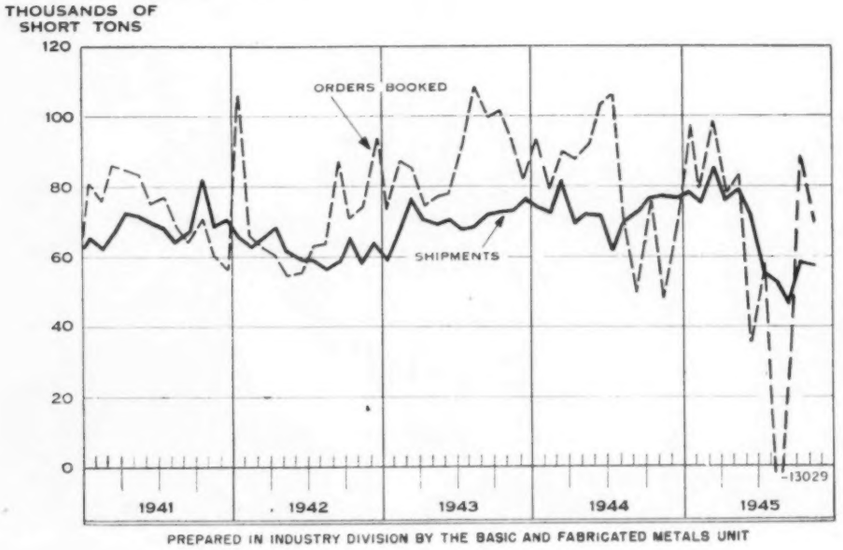
Castings for transmission housings have been a persistent and critical item, running head on into requirements of other reconverting industries. Wringers have been a nuisance of varying degree to individual manufacturers.

Rather than running at full production until the end, most manufacturers have tapered output in order to retain production organizations in the hope that by some miracle the supply problem would suddenly be solved by an end to the steel and electrical strikes.

The industry's battle of attrition with the Office of Price Administration has caused almost as much concern as production problems. The OPA set-to resulted initially in a long delay in announcing prices which led most manufacturers to keep their products off the market even after some production had been attained. Manufacturers have assailed the 7.7 pct price increase granted them over 1941 as inadequate, declaring that hourly wage rates in the industry have increased from 40 to 48 pct since the base period. Lower selling expense, which has been one of the OPA's basic reasons for keeping prices down, is more than offset by increased manufacturing expense, the industry contends.

Even when the strike problem is finally settled and a regular flow of components established, it is estimated that four months will be required for top production.

MALLEABLE CASTINGS: *In the foundry industry, production and shipments are so closely related that for all practical purposes shipments can be considered as a measure of production. Shipments of malleable iron castings for November* 1945 *amounted to* 57,315 *short tons according to a report released today by the Bureau of the Census. These shipments were* 3 *pct lower than the shipments of* 59,096 *tons in October, and* 26 *pct lower than the* 77,528 *tons shipped during November* 1944. *New orders booked, less cancellations, for malleable iron castings during November were* 69,092 *tons,* 22 *pct lower than the October new orders.*



PREPARED IN INDUSTRY DIVISION BY THE BASIC AND FABRICATED METALS UNIT

Steel Supply Crisis Brings Criticisms of Disposal Activities

Cleveland

• • • **While the alleged** accumulation of surplus steel in government warehouses is admittedly open to a good deal of speculation, the present steel crisis has placed the services and the disposal activities of the War Assets Corp., nee RFC, in the critical glare of the supply spotlight.

According to reports, there are some sizable tonnages that have not been declared or released by the Army, Navy, Maritime Commission and some other divisions, but whether this would be sufficient to alleviate the current shortage is doubted by some observers here.

On the other hand, one prominent steel executive was told in Washington some weeks ago that 85 pct of the contract termination procedures would be concluded by the end of 1945, which means that most of the steel coming from the war contractors has already been declared to the government, hence tonnages from these sources will probably not be very great in the future.

Estimates on the possible steel surplus the Services may have vary a great deal, but at the time surplus steel and attendant disposal problems were first discussed it was thought that some 35,000,000 tons might be available. At the present time, competent observers doubt that the surplus would aggregate or exceed three and one half million tons. A factor here may be the purchases of contractors who have absorbed a lot that never moved from their plants.

Analyzing the problem critically, some sources in the trade feel that the services and War Assets Corp. should make available immediately whatever tonnages they have on hand. Part of the delay in the appearance of the surplus now, it is pointed out, can be attributed to government disposal procedures, and while War Assets Corp. is understaffed as the agency itself submits, procedures should be streamlined. In this area, however, there are some 2200 people working on the disposal of surplus war property.

Other sources in the trade feel that the projected avalanche of surplus is a myth, and that while the services may have some, they cannot have any considerable tonnage, nothing approaching millions of tons, at least, and that much steel went overseas and will never come back.

Non-Union Labor Pays For Union Protection By Payroll Deduction

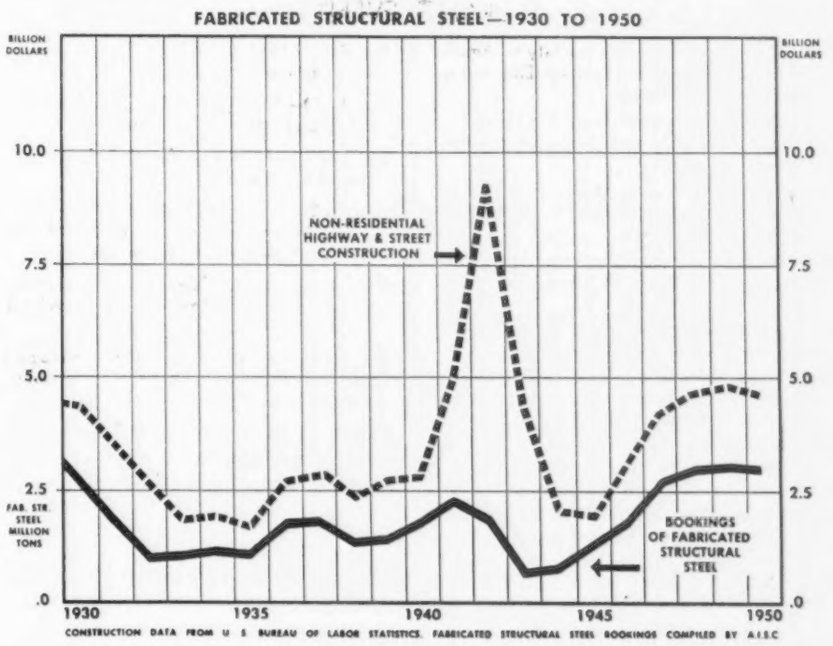
Windsor, Ont.

• • • **One of the most** noteworthy developments in Detroit labor during the past week, or any week for that matter, was the arbitration decision which was agreed to as part of the settlement in the Ford Motor Co. of Canada plant at Windsor, Ont. Some completely unprecedented decisions were handed down by the Supreme Court Justice Ivan Rand, the government-appointed arbitrator.

Most unusual of the many unusual provisions was the order that henceforth all employees at Ford of Canada, whether they belong to UAW or not, will have dues checked off. The thinking of the Justice was that the non-members of the union benefit by pay drives and other reforms sought by the union, and hence should be compelled, so to speak, to pay for them. The non-union members will not be charged for any special assessment but will have $1.00 a month taken out of their pay just as if they belonged to the union. The upshot of this obviously will be to create union members out of non-unionists.

Another proviso embracing non-union members as well as unionists was that all employees of the plant shall vote on any strike call, and that a strike is illegal unless a majority of those voting approve. Should a strike follow after a negative vote, or should one occur without a vote, it must be declared invalid by the union officers, and picket lines must be declared equally illegal. Participants in such walkouts or employees staying away from work shall be liable to fines of $3.00 a day for every day's absence from work, and to loss of one year's seniority for every continuous absence of a calendar week or part of a week. This loss of seniority provision, it might be mentioned, is being considered in connection with dispute settlements in the United States at several points. Should the union itself violate the company security provisions by declaring a strike other than authorized, it shall be liable for the penalty of a suspension of the check-off of not less than two and not more than six months.

FABRICATED STEEL: *The American Institute of Steel Construction projects into the postwar era the correlation between non-residential, highway and street construction, and fabricated steel bookings.*



Steel Corp. Requires Price Rise in Excess Of $6.25, Olds States

New York

• • • **The United States Steel** Corp. will require a price increase greatly in excess of $6.25, Irving S. Olds, chairman of the board declared after the quarterly meeting of the board of directors last week. Increased past costs necessitate a price increase to which the corporation is legally entitled, he indicated. A wage increase of 15c an hr alone would require an additional price increase of $5 a ton while an hourly increase of 18½c would necessitate a corresponding price rise of $6.25, he explained.

Directors of the corporation voted the usual dividend of $1 a share on the common stock from earnings in the fourth quarter of 1945, despite the strike, and ordered the payment of the regular quarterly dividend of $1.75 a share on the preferred stock.

After allowing for various adjustments in the fourth quarter resulting from termination of the war, and other causes, net income was $13,267,300, compared with $10,985,624 in the corresponding quarter the previous year.

Net income for the whole of 1945 was reported as $57,045,093, compared with $60,791,281 in 1944. Dividend payments for 1945 exceeded by $2,987,592 the amount earned, in contrast with a surplus of $758,596 after dividends in 1944.

Ingot production averaged 72 pct in the fourth quarter and 82 pct for the whole of 1945, Mr. Olds said. Exports remained at virtually the 6½ pct level of total tonnage sales which prevailed during the later war years.

Sales for the fourth quarter were $370,052,269, against $546,-226,921 a year before, and for the full year amounted to $1,744,-037,559, compared with a high of $2,082,010,663 in 1944.

Wage-Price Talks Not Binding to Bethlehem, Chairman Tells Press

New York

• • • **Eugene G. Grace,** chairman of the Bethlehem Steel Co., revealed after the quarterly meeting of the board of directors last week that neither he nor Bethlehem had been consulted in the current price-wage negotiations among U.S. Steel Corp., the United Steelworkers of America and the government. Therefore, the chairman said, Bethlehem was not committed to adhere to the terms of settlement that may be arrived at by the negotiators.

Mr. Grace also said that, except in the Lackawanna plant where workers had jumped the gun in the strike and had refused to draw the furnaces even before the strike deadline, there had been no disorder at any of the company's plants. He estimated that an ingot rate of 80 pct could be reached in the other plants in ten days. But Lackawanna, with a capacity of 265,000 ingot tons, would require some ten weeks to begin operations.

While Mr. Grace would not make any statements on the progress of the steel wage-price negotiations, he had prepared a chart showing that Bethlehem's average hourly earnings of steel plant employees, exclusive of selling and administrative forces, exceeded 1923 by 135 pct. Meanwhile THE IRON AGE composite prices of products representing approximately 85 pct of the total domestic steel production, showed a drop of ten pct during the same period, the chart showed.

The chairman stated that employees of Bethlehem averaged $49.98 in the last quarter of the year, including overtime, as compared with $64.85 a year ago. Bethlehem's U.S. employees were reported to have declined from a wartime peak of 295,740 in the 3rd quarter of 1943 to 154, 768 in the last quarter of 1945. A year ago there were 239,765.

Mr. Grace said that the estimated cost of authorized construction projects to be completed equaled $134 million, compared with $78 million three months ago. The principal items of newly authorized construction include a 66 in. hot strip mill, a 70-oven coke battery and an ore sintering plant at Sparrows Point, Md., improvements to the Los Angeles plant, a new coal washing program, extension of the Venezuelan ore development and a fleet of eight oceangoing ore carriers.

Orders on hand at the end of the year totaled $468 million compared with $1240 million a year ago and a peak of $2394 million at the end of 1942. Of these figures shipbuilding volume represented $213 million at the end of the year compared with $2052 million a year ago.

COMING EVENTS

Feb. 13-14—Steel Founders' Society of America, Annual Industry Meeting, Edgewater Beach Hotel, Chicago.

Feb. 25-28—Annual Meeting, American Institute of Mining and Metallurgical Engineers, Chicago.

Feb. 25-Mar. 1—Spring Meeting, American Society for Testing Materials, Hotel William Penn, Pittsburgh.

Mar. 4—SAE German Engineering Evaluation Meeting, Rackham Educational Memorial, Detroit.

Mar. 5-6—Midwest Quality Control Conference, La Salle Hotel, Chicago.

Mar. 20-22—Production Show and Conference, Chicago Technical Societies Council, Stevens Hotel, Chicago.

Mar. 29-30—American Gas Assn. Conference on Industrial and Commercial Gas, Commodore Perry Hotel, Toledo.

Apr. 2-5—Packaging Exposition, sponsored by American Management Assn., Public Auditorium, Atlantic City, N. J.

Apr. 3-5—SAE National Aeronautical Meeting, Hotel New Yorker, New York.

Apr. 8-12—ASTE Exposition, Cleveland Public Auditorium, Cleveland.

Apr. 11-13—Spring Congress, Electrochemical Society, Inc., Birmingham, Ala.

Apr. 22-27—National Plastics Exposition, Grand Central Palace, New York.

Apr. 25-26 — Twenty-ninth AIME Annual Open-Hearth Steel and Blast Furnace and Raw Materials Conferences, Chicago.

May 6-10—Golden Jubilee Foundry Show, American Foundrymen's Assn., Cleveland Public Auditorium, Cleveland.

May 29-31 — Machine Dealers National Assn., national convention, Claridge Hotel, Atlantic City.

June 2-7—SAE Summer (semi-annual) Meeting, French Lick, Ind.

June 3-5—American Gear Manufacturers Assn., Annual Meeting, The Homestead, Hot Springs, Va.

June 24-28—Forty-ninth Annual Meeting, American Society for Testing Materials, Buffalo.

Weekly Gallup Polls . . .

Labor Legislation Seen as Prime Election Issue

• • • **The American public,** at this time, believes that strikes and labor legislation will be the most important issue in the 1946 Congressional elections campaign, according to George Gallup, director, American Institute of Public Opinion.

This is on the basis of the number of persons naming strikes and labor legislation as the problem they believe will be the main issue next November. Proportionately more Republicans name it the big election issue than Democrats.

The Republicans and Democrats who called strikes and labor legislation the principal problem were asked which party they think is better equipped to handle the problem. Voters think their own party is equipped to do the job better than the opposition. There is no general feeling that either the Democratic or Republican party is better able to handle the job.

From this it may be deduced that neither party has as yet gained or lost strength as a result of the strikes now sweeping the country. Of course, what happens in Congress and throughout the country on the question of industrial strife may very well change this picture in the months ahead.

The question used in the survey to find out what the voters think are to be the main issues in November:

"In the coming Congressional election which will be held next November, what do you think will be the main issue?"

Aside from labor legislation and strikes, the issue leading the list, with twice as many votes as its nearest competitor, is full (or high) employment.

The people who name employment as the big issue in the 1946 elections appear to be taking their cue from a look into the future. For, apart from people out on strikes, unemployment remains today at an amazingly low figure. Moreover, a recent survey by the institute found that only about nine persons in every 100 named finding a job as the most important problem facing him at the time.

It is nevertheless apparently the belief of a substantial segment of the population that employment is going to loom increasingly important between now and next November.

Third comes the problem of inflation. What actually happens to this as an issue between now and November will depend in some part at least upon what Congress does about extending, modifying, or eliminating price controls.

Taxes and government spending, in sharp contrast to other recent years, are far down the list of issues. Institute surveys have in previous years found them high on the list of problems facing the country, in the opinion of the rank and file.

The main election issues in 1946, as given in reply to the poll queston are:

(1) Labor legislation and strikes
(2) Full (or high) employment
(3) Inflation
(4) Reconversion
(5) Veterans affairs
(6) Housing
(7) Military training
(8) Taxes

An important question in this election year is whether the political reactions of veterans of World War II differ from those of the rest of the country. One popular theory is that veterans, because of the experience they have been through, are inclined to think and vote differently from the rest of the population.

A poll just completed across the nation shows, however, that the average ex-GI reacts politically in just about the same way as the rest of the population in his age group. There is nothing peculiar or different about him that sets him apart, politically, from people in the 21 to 29 age bracket.

The political sentiments of servicemen who have been released from service thus far have been

Party Strength Unaffected By Nationwide Strike Wave; Youth Strongly Democratic

• • •

tested twice in cross-section surveys recently on the issue:

"If a presidential election were being held today, which party would you vote for—Democratic or Republican?"

	Dem. Pct	Rep. Pct
World War II veterans.....	65	35

A previous poll in December showed approximately the same results, 63 pct Democratic.

Sentiment among other young people is shown in the following figures:

	Dem. Pct	Rep. Pct
21-29 yr of age	62	38

It is possible, of course, that young men who are still in the armed forces awaiting their release have a somewhat different political attitude from those already released. The resentment of many servicemen over what they consider to be the slowness of demobilization may conceivably turn some against the party in power in Washington.

One of the major problems facing the Republican party strategy committee is how to win into the GOP fold a larger share of the two or more million young people who come of voting age every year in this country.

The Republican party is unquestionably suffering from a shortage of new blood. At the present time, out of every three arriving at voting age, one is Republican, two are Democrats.

The problem looms even more serious than at first might be supposed by further evidence from surveys showing this proportion, two-to-one Democratic; as early as the 15-18 year old age bracket.

This picture emerges from a study of political opinion by age

(*Concluded on page* 124)

First Official Malayan Tin Report Optimistic

London

By JACK R. HIGHT

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• • • **The first official** reports of the official tin inspection committee sent to Malaya have now reached Britain. From these reports and from existing knowledge of labor and transport difficulties that have arisen since the defeat of Japan, it appears that the condition of the equipment is better than had been expected.

A. D. Storke, adviser to the British Colonial Office on the Malayan tin mining industry, who went to Malaya to review the situation while the tin inspection committee was at work, estimates in his report that if the proposed repairs program is realized, the production of tin in 1949 may amount to about 90 pct of the prewar figure.

Mr. Storke also states that the power plants which supplied electricity to the minefields are mostly in fair working order, but the coal shortage may restrict the output of power, and consequently of tin, unless the rehabilitation of the collieries at Batu Arang can be accelerated. About 70 pct of the labor force is available.

The Chinese mines have suffered more severely than the dredging companies. One-third of the dredges are reported to be capable of being put into production within seven months if repair material is provided without delay, and another one-third within approximately a year after that.

In its investigation, the tin inspection committee classified the dredges into four categories:

Category A—Dredges which it may be possible to put into operation by Aug. 1, 1946.

Category B—Dredges which it may be possible to put into operation by June 1, 1947.

Category C—Dredges which it may be possible to put into operation by Jan. 1, 1948.

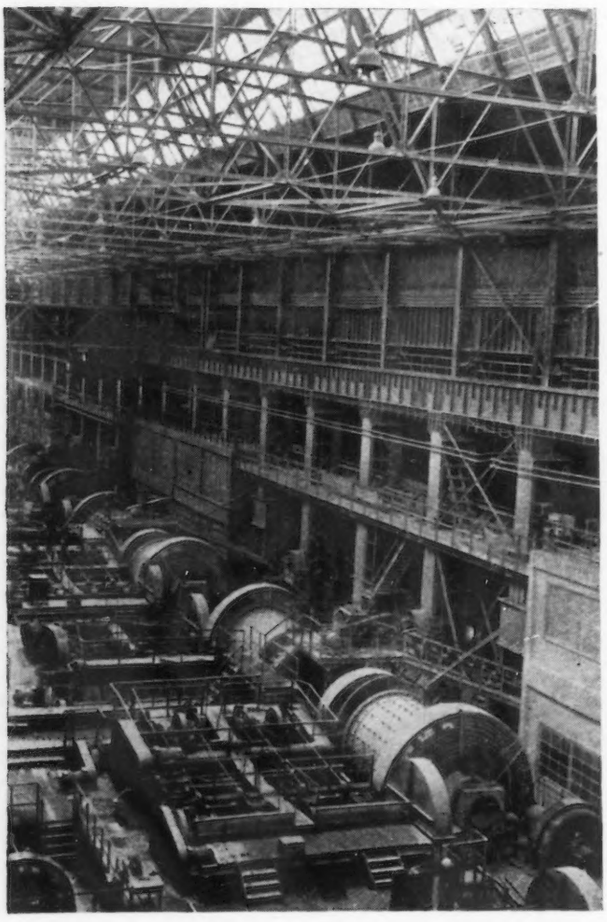
Category D—Dredges which have been dismantled completely and which have only a scrap value.

These categories are intended only as a guide, and the least delay in the initial supply of repair material will make it impossible to meet the deadline for Category "A." When the flow of supplies is established and the supply of skilled and semi-skilled labor (over 70,000 men were previously engaged in the industry) is assured it is possible that the date for Category "B" dredges may be anticipated. It seems possible that the gap between the two may be closed to some extent.

Only 22 out of the 126 dredges in Malaya have been put into Cate-

Key to Categories

Name of Company	A	B	C	D	Total
London Tin Group					
Ampat Tin Dredging Ltd.	2	1	–	–	3
Batu Selangor Tin Dredging Co. Ltd.	1	–	–	–	1
Berjuntai Tin Dredging Ltd.	–	1	–	–	1
Jelapang Tin Dredging Ltd.	–	1	–	–	1
Kampong Lanjut Tin Dredging Ltd.	–	1	1	–	2
Kamunting Tin Dredging Ltd.	1	3	–	–	4
Klang River Tin Dredging Co. Ltd.	–	1	–	–	1
Kramat Tin Dredging Ltd.	1	–	–	–	1
Kuala Kampar Tin Fields Ltd.	–	2	1	–	3
Kuchai Tin Ltd.	–	1	–	–	1
Kundang Tin Dredging Ltd.	–	–	–	1	1
Larut Tin Fields Ltd.	2	–	–	1	3
Lower Perak Tin Dredging Ltd.	2	–	–	–	2
Putch Tin Dredging Co. Ltd.	–	1	–	–	1
Rantan Dredging Co. Ltd.	–	2	–	–	2
Rawang Concessions Ltd.	1	–	–	–	1
Rawang Tin Fields Ltd.	1	1	–	1	3
Southern Kinta Consolidated Ltd.	2	5	3	–	10
Taiping Consolidated Ltd.	–	1	–	–	1
Tambah Tin Syndicate Ltd.	–	1	–	–	1
Tongkah Harbour Tin Dredging Ltd.	–	1	–	–	1
Osborne Chappell Group					
Kent Tin Dredging Ltd.	1	–	–	–	1
Pengkalen Ltd.	1	–	–	1	2
Tekka Taiping Ltd.	1	–	1	1	3
Tronoh Group					
Ayer Hitam Tin Dredging	–	1	–	–	1
Kepong Dredging Co. Ltd.	–	1	–	–	1
Southern Tronoh Tin Dredging Ltd.	2	–	–	–	2
Sungei Besi Mines Ltd. (Pelapah Dredge)	1	–	–	–	1
Tronoh Mines Ltd.	2	2	–	1	5
Bright and Galbraith Group					
Honkong Tin	1	–	–	–	1
Killinghall Tin Ltd.	–	1	–	–	1
Ipoh Tin Group					
Ipoh Tin Dredging Ltd.	–	1	1	–	2
Sungei Kinta Tin Dredging Ltd.	1	–	–	–	1
Temoh Tin Dredging Ltd.	–	–	–	1	1
Malayan Tin Group					
Malayan Tin Dredging Ltd.	1	3	–	–	4
Southern Malayan Tin Dredging Ltd.	2	3	2	–	7
Renong Tin Dredging Co. Ltd.	2	–	–	–	2
Chenderiang Tin Dredging Ltd.	–	–	1	–	1
	28	35	10	7	80



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RUSSIAN COPPER: *A general view of the ore crushing dept. of the copper concentration plant, which is located on the shores of Lake Balkhash in the Kazakh Republic.*

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gory "D" as being entirely useless and experts here indicate that many of these were already obsolete before the war. Of the remaining dredges 41 are in Category "A," 46 in Category "B" and 17 in Category "C."

From the announcements so far made by various tin companies, based on the inspection committee's report, the list which follows has been compiled. It is not yet complete. European-owned opencast and hydraulic mines have been automatically placed in Category "A" and are not listed.

Dredges before the war, that is, in 1940, accounted for 42,200 gross tons of tin a year out of a total output of 80,700 gross tons; a further 30 pct was produced by the Chinese, and the balance by European gravel pumping, hydraulicing, and opencast enterprises. Gravel pumping, which accounted for 35 pct of the total annual output, is the method which lends itself most readily to rebuilding, and the British government has already placed orders for substantial quantities of supplies for that purpose (making provision for the Chinese operations) in order to secure supplies of the metal as early as possible.

The rehabilitation program has already been outlined, and the procedure for obtaining supplies has been arranged. Mr. Storke's estimate for the cost of rehabilitation is little more than half of the estimate which was made before his visit to Malaya, which alone shows the position of the tin industry in a more favorable light.

Reports from the eastern manager of the Consolidated Tin Smelters subsidiary company, the Eastern Smelting Co. Ltd., state that their Penang smelter is now ready to resume operations. The smelter was used by the Japanese during their period of occupation and consequently was reclaimed in a comparatively good condition. Prior to the war this smelter (which also smelted most of the Siamese tin ore) had an annual capacity of 75,000 gross tons of tin ore. It is now in a position to smelt as much as Malaya and Siam are able to produce during the next two years.

The condition of the Straits Trading Co. smelters at Singapore and Penang has not yet officially been made known. Contrary to earlier optimistic assumptions, the Ministry of Supply has officially reported that 4500 tons of metallic tin were found in Malaya.

Leading Australian Firm Suffers Manpower Pinch

London

• • • **Prewar extensions** and additions to steel mills in Australia increased that country's steel ingot capacity to over 2,000,000 gross tons per year, according to a statement made recently by H. C. Darling, chairman of the Broken Hill Proprietary Co. Ltd., and made it possible for Australia to have ample supplies of steel throughout the war.

In a resumé of his company's activities during the war years at the firm's annual general meeting held in Melbourne he recounted the activities of the Commonwealth Aircraft Corp. Pty. Ltd., which is a subsidiary, in production of new planes for the RAF and the American Air Forces, as well as the steelmaking production of the parent organization.

According to his statement the declaration of war in Europe cut the southern continent off from supplies of tungsten carbide, and the firm's Newcastle organization developed a process for the manufacture of a suitable product in adequate quantities. To replace the alloys normally used for the making of bulletproof steel a substitute material was developed from a mineral found on the sea beaches of northern New South Wales. The plate thus produced was said to meet all specifications, including good weldability and was produced during the war in large quantities.

Mr. Darling disclosed that the electric steel and forge plant located at Port Kembla early in the war has been closed down, after producing a large number of gun barrels for the war. According to his statement the capital cost of the plant was borne by the firm.

The establishment of the ferro-alloy plant at Newcastle provided almost every alloy essential for alloy steelmaking and was designed to eliminate the overseas shipping problem during the war. The magnesium plant built by the Broken Hill group during 1940-41 has, according to the chairman, fulfilled its purpose in supplying the aircraft industry during the war, when imported supplies were unobtainable. The demand has now fallen to such an extent that magnesium manufacture by this organization is uneconomical, and further production at present is deemed unwarranted.

The company's entry into the shipbuilding field was another war-

POSTWAR PISTONS: *A typical scene on the motor assembly line at the Urals Automobile Works, Russia, where two workers are shown assembling pistons.*

time activity, including the construction of navy patrol vessels, merchant ships, two steamers for their own fleet to replace wartime losses, landing craft and steel tugs. The program included the construction of marine engines and large quantities of auxiliary equipment.

A wider range of special alloy steels for munitions use, aircraft engine cylinder assemblies, arming and degaussing of merchant ships, and the loaning of technical personnel and knowledge were also part of the firm's war activities.

In regard to the present situation, Mr. Darling pointed out that although business had moderated somewhat with the loss of war business, present orders will keep the mills occupied for some time, and ordering is expected to pick up as reconversion progresses.

The South Australian ore mines operated throughout 1945 at a rate equal to what the available shipping could handle, and it was revealed that 1,364,141 gross tons of iron ore were obtained from several small deposits in New South Wales. Were it not for this ore and also the heavy stocks of iron ore at Newcastle and Port Kembla when the war broke out, Australia's steel production would have suffered heavily. These mines in New South Wales have now been closed, as their costs do not compare with those of Whyalla stores.

Visits of the firm's mining engineers to New Caledonia for the purpose of visiting iron ore deposits there were also revealed. As a result of the visits the Broken Hill Proprietary Co. has taken options on certain large areas and is at present conducting tests to determine the quantity available and the suitability of the ore.

Until the coal position improves Mr. Darling indicated that it will be impractical to reopen the blast furnace at Whyalla, although improvements are being made in the furnace and it is being kept in good condition.

Production at the Port Kembla works of Australian Iron & Steel, Ltd., have been affected by a shortage of labor and coal. Owing to the need for increased coke production at this works the firm started construction of an additional battery of coke ovens, but this work has been halted to divert the labor to other tasks. Preliminary work has already been done on the planning of a new combination rod, bar and strip mill, also to be located at Port Kembla.

The development of Broken Hill's ironstone deposits which are located on Cockatoo Island, Yampi Sound, is actively proceeding according to the report, and the mines will probably be in production soon. These ore deposits are said to be low in manganese and suitable for blending with South Australian iron ore for steelmaking purposes, thus conserving mainland supplies. This development is hoped to be complete by the end of this year. Previous installations of this nature have used heavy machinery which has been imported, but efforts are being made to manufacture the needed equipment, including an 84 in. by 60 in. crusher and several electric shovels, in the firm's own workshops.

With the decreased demands for war steel the Commonwealth Steel Co.'s production has been diverted to merchant needs, but the demand for stainless steel polished sheets is exceeding capacity, and plans are being drawn up for the installation of additional equipment.

PERKIN MEDAL AWARD: *Dr. Francis C. Frary, director of research, Aluminum Co. of America, left, after receiving the Perkin Medal in New York recently in recognition of his accomplishments in the field of industrial research. The medal given annually for distinguished service to the chemical industry by the American Section of the Society of Chemical Industry, the American Chemical Society, the American Institute of Chemical Engineers, the Electrochemical Society and the Societe de Chimie Industrielle. The presentation was made by Dr. Marston T. Bogert, emeritus professor of chemistry, Columbia University (right).*

Australian demands for railway wheels and tires are covered adequately by production, and some exports of assembled wheels, tires and axles to India are being arranged. The wire mills of Rylands Bros. (Aust.) Pty., Ltd., and Lysaught Bros. & Co., Pty., Ltd., had been handicapped by the labor shortage also in their wire fencing business and are unable to furnish all of Australia's needs, although the facilities are adequate to do so. With the possibility in mind of the extension of the business to Victoria, Rylands Bros. has recently purchased an area of land at Geelong.

Belgian Steel Firms Continue to Export

London

• • • **Belgian steel** firms are continuing to make deliveries to countries with which trade agreements have recently been signed, according to the *Iron and Coal Trades Review*. Shipments are said to have been made recently to Morocco, Egypt, Palestine, South America and South Africa. Rerollers, despite a continuing shortage of raw materials, have managed recent shipments of small special sections and joists to South and Central America and the Near East.

The Usines Métallurgiques du Hainaut is now preparing to restart its largest blast furnace, while the Sambre-et-Moselle concern is to put into operation as from Feb. 15 two blast furnaces, a battery of coke ovens, and two rolling mills. It is stated that Cockerill is to relight a furnace at Seraing. Usines de la Providence and Aciéries et Minières de la Sambre, of Monceau-sur-Sambre, are operating their coking plants.

The Belgian Iron & Steel Control states that, though production remains below the 1943 maximum, it has regained and exceeded its prewar level. Exports show an encouraging development, though they still only amount to about half the 1935-38 level. In the last quarter of 1945, output reached a level equivalent to 12,300,000 metric tons a year, and exports rose to a rate of 1,200,000 metric tons a year, against 188,000 metric tons during the first quarter and nearly 2,500,000 tons during 1935-38.

Inland Steel Wages Held Keeping Pace With Living Costs

Chicago

• • • **According to** E. L. Ryerson, chairman of the board, Inland Steel Co., the earnings statement of the company, before final audit, for the year ending December 31, 1945, shows a net profit of $9,861,210.00, equivalent to $6.04 per share on the 1,633,105 shares of stock now outstanding. This compares with the earnings for the year 1944 of $10,249,-395.00, equivalent to $6.28 per share.

Mr. Ryerson continues. "The average hourly basic wage, without overtime, of all workers in our steel mill was 88.9c per hour for the month of January, 1941. The average rate paid in October 1945 was $1.144. The increase fully covers the increased cost of living for the same period as reported by the United States Dept. of Labor. The average actual weekly pay of our workers in October 1945, including overtime and incentive payments for increased production, equalled $54.26 per week.

"Since the beginning of the strike, our properties have been maintained in a manner to protect our furnaces and equipment so as to insure against any damage to such facilities and to make it possible to resume operations immediately upon termination of the strike.

"We are ready, at all times, to bargain with the agencies which our employees choose to represent them, but we believe it is important that our employees and their representatives appreciate the fact that nothing can be gained by presenting demands which prohibit the possibility of their acceptance by the Inland Steel Co."

Says Malleable Iron Castings Prices Not Tied to Steel Wages

Washington

• • • **Malleable iron castings** producers cannot expect an automatic price increase based on whatever percentage wage increase as may be granted steelworkers, the OPA told members of the Malleable Iron Castings Industry Advisory Committee at a meeting held Jan. 31.

Industry members who originally expressed dissatisfaction over the companies included in the sample survey which was the basis for the recent OPA denial of the industry's request for a price increase reportedly withdrew their objection when OPA spokesmen outlined the scope of the study. The earlier denial was based on the fact that the third quarter figures were not representative of normal financial data.

Since OPA is not allowed to include unapproved wage increases in calculations of price increases, committee members were told that the answer to present problems rests not with OPA but with agencies dealing with wage and stabilization problems.

Foundries are still beset with labor shortages but the situation is very spotty. A number of foundries are shut down as a result of the present steel strike, 13 out of the 30 foundries represented at the meeting having been closed.

Buys Joliette Steel Ltd.

New York

• • • **American Brake Shoe Co.** has announced the purchase of Joliette Steel Ltd., producers of manganese and alloy steel castings in Canada. The company will be operated by the present management, working under the direction of Brake Shoe's American Manganese Steel Div. Joseph B. Terbell will head the company, and J. L. Mullin, vice-president.

Brake Shoe has planned an expansion and mechanization program for Joliette Steel. Production will be increased and a wider range of alloy steel products produced. AMSCO products such as manganese dredge buckets, dippers, frogs and switches, crusher parts and mill liners will now be produced in Canada.

German Steel Future Becomes Political Dynamite

London

. . . Sharp differences in viewpoint on the future of the German steel industry are beginning to come to a head in the form of high level discussions among the four occupying powers. The discussion has reached print here following the disclosure from Berlin some two weeks ago that by agreement among the powers the future ingot capacity of the German industry is to be 7,500,000 tons, but the annual output is not to exceed 5,800,000 tons.

Reaction to published reports in Britain of this agreement brought immediate reaction, both in London and among the other major powers. High British viewpoint (see THE IRON AGE—Jan. 3, 1946, p. 160) favors an agreement nearer 10,000,000 tons. In addition to this fact, the same newspaper that printed an "exclusive" of the first Berlin story came back a week later with a cautiously worded explanation that perhaps there was no agreement as yet. The general idea was that there had been one of those unfortunate errors in translation, and that while the British translation was that the 7.5 figure was to prevail, actually the other powers intended to set 5.8 as a maximum limit.

The entire picture is pressed into a major question for the occupying powers because France, acutely aware of the key character of the Ruhr's steel production, is insisting that her demand for internationalization of the Ruhr be accepted, before any peace is made with Germany. The whole picture for possible international control of the Ruhr is inextricably bound up with the lack of agreement among the big three on operating methods.

In general, France is the demanding nation in this respect and Russia, according to reports here, would probably acquiesce if the other powers agreed on the proposal. There is, however, considerable cynicism on the part of both Britain and America as to the wisdom of international control arrangements in general, as well as a growing conviction that partition, further than that which has been accomplished already in the east, would leave a perpetual sore spot that would be certain to cause trouble in the future.

Lt. Gen. Lucius Clay, deputy to General McNarney on the American control team added his fat to the fire on his return to Berlin recently from conferences on the subject with Secretary of State James F. Byrnes. He pointed out that which was no longer news, that it seemed certain that the steel question would have to be solved before any lasting decision could be made on other questions. His statement went on to indicate that the dilemma was a difficult one, but one that should be easily absolved. He did not indicate the nature of his solution.

Industrial Briefs...

• PLASTIC PACKAGING — Monsanto Chemical Co., St. Louis, Mo., has set up a packaging materials sales dept. in its plastics div. The new department will be active in all major uses of plastic resins alone and in conjunction with paper metal foil, paper board and transparent sheets in packaging.

• DONATION—The Detroit Ordnance District has donated more than $6,500,000 worth of production equipment tools and mechanical aids from its excess supplies to educational institutions.

• BUYS G-P SUBSIDIARY—Federal Machine & Welder Co. has bought Warren City Mfg. Co., wholly-owned subsidiary of Graham-Paige Motors Corp. Details of the transaction were not disclosed. Built for war production at a cost of $7,000,000, the Warren City plant has 225,000 sq. ft. of floor space and is adapted to heavy manufacturing. During the war, the plant was used for construction of landing barges and other naval equipment.

• ACQUISITION—Announcement has been made of the purchase of the Pottstown Pipe Products Co., Pottstown, Pa., by the National Roll & Foundry Co., Avonmore, Pa.

• NEW DIVISION — The Rotary Electric Steel Co., Detroit, has formed a new subsidiary, Stainless Products, Inc., which will produce stainless steel of various types at a recently acquired plant at Elizabeth, N. J.

• TO REPRESENT — The Brooks Equipment Co., San Francisco, has became new West Coast representative for C. B. Hunt & Son, Inc., Salem, Ohio.

• CHANGES NAME—The Bearing Products Co., Philadelphia, has changed its name to Bearing Appliance Co.

• SELLS DIVISION — The West Co., Inc., Philadelphia, has sold its abrasive div. to the newly organized company—West Abrasives, Inc. The new company is associated with General Grinding Wheel Corp., Philadelphia.

• SETS UP OFFICE—C. G. Singleton, formerly with Heppenstall Co., resigned to establish his office at 225 Broadway, New York.

• BUILDING OUTLAY—Construction expenditures of more than $8,000,000 have been approved by the board of directors of Alabama Power Co. for 1946, which will go for construction of rural electric lines and facilities, the building of a number of new substations, and the purchase of new equipment for a number of generating plants.

• FORD BUILDS — Construction has started on the new $800,000 sales and parts branch of Ford Motor Co. at Des Moines. The one-story building will serve as a sales distribution center for Ford, Mercury and Lincoln passenger cars, as well as supplying car and truck service parts to dealers and owners in the area.

• ORGANIZES COMPANY—Ralph F. Peo, of Buffalo, who formerly was vice-president of the Houdaille-Hershey Corp., and general manager of the Houde Engineering Div., is organizing Frontier Industries, Inc., a new company which will produce automotive parts.

• BOUGHT BY ROCKWELL — The Rockwell Mfg. Co., Pittsburgh, has purchased the Arcade Mfg. Co., Freeport, Ill., manufacturer of feed grinders, plows and agricultural equipment. The announcement follows the recent acquisition by Rockwell of the Delta Mfg. Co., Milwaukee.

• CHANGES NAME—The Sheboygan Gray Iron Foundry Co., Sheboygan, Wis., has changed its name to Austin Gray Iron Foundry Corp.

Canada Steel Workers Plan United Action

Hamilton

• • • **Plans for united** action by all Canadian steel and iron workers for standard wage agreements providing a weekly minimum wage of $33.60 will be drafted at a conference of the United Steelworkers of America, (CIO), C. H. Millard, Canadian director of the union stated.

Representatives of the Canadian Congress of Labor, United Automobile Workers,, (CIO), United Packing House Workers, (CIO), Mine, Mill and Smelter Workers, (CIO) and United Rubber Workers, (CIO), have been invited to attend conferences.

Mr. Millard stated that reports reaching union headquarters indicated opposition by employers to higher wages and shorter hours. Steel locals interested are those of the Dominion Steel & Coal Corp., Sydney, N. S., Algoma Steel Corp., Sault Ste. Marie, and Steel Co. of Canada, Ltd., Hamilton.

Gallup Poll

(CONCLUDED FROM PAGE 119)

groups, including a poll of young people 15 to 18 yr of age. The latter were asked:

"Which political party do you think is the best in the country?"

Voters of the country were polled on the question:

"If a presidential election were being held today, which party would you vote for—the Democratic or Republican?"

Teen-Agers

	Dem. Pct	Rep. Pct
15-18 yr of age	65	35

Other Age Groups

	Dem. Pct	Rep. Pct
21-29 yr of age	62	38
30-49 yr of age	55	45
50 and over	49	51

These differences of attitude have a significant bearing on the future of both political parties.

Between presidential elections, between eight and ten million young people become eligible to vote. If only 50 pct of these young people turn out at the polls, their vote of almost two-to-one Democratic would be enough to offset a substantial defection among older persons.

Construction Steel...

New York

• • • **Fabricated steel awards** this week included the following:

3000 Tons, Toledo, plant for Libby-Owens-Ford Glass Co. to Whitehead Kales Co., Detroit, through Stone & Webster Engineering Corp., Boston.

1100 Tons, East Chicago, Ind., General American Transportation Corp., structures, to American Bridge Co., Pittsburgh.

900 Tons, New Albany, Ind., Gunnison Homes, Inc., plant No. 1, to American Bridge Co., Pittsburgh.

670 Tons, Los Angeles, toll building, Southern California Telephone Co., through P. J. Walker Co., to Bethlehem Pacific Coast Corp., San Francisco.

500 Tons, Burlington, Iowa, manufacturing plant to American Bridge Co., Pittsburgh, through Jackson & Moreland, Boston, engineers.

465 Tons, Chicago, Illinois Institute of Technology, metallurgy building to American Bridge Co., Pittsburgh. (Reported Jan. 24 as 250 tons.)

450 Tons, Conroe and Leonidas, Tex., state highway bridge, reported to Pennsylvania Iron Works.

330 Tons, Freeport, Ill., state highway bridge, to Illinois Steel Bridge Co., Jacksonville, Ill.

325 Tons, Chicago, Maxwell Bros., Inc., factory building to American Bridge Co.

325 Tons, Burbank, Calif., Walt Disney studios, to Consolidated Steel Co.

308 Tons, Chicago, alterations to Conway Building, to American Bridge Co., Pittsburgh.

220 Tons, Mandan, N. D., state highway bridge over Park River, to Illinois Steel Bridge Co., Jacksonville, Ill.

• • • **Fabricated steel inquiries** this week were as follows:

1520 Tons, Between Ainsworth and Brighton, Iowa, Rock Island RR bridges.

1350 Tons, Peoria, Ill., Pabst Brewing Co. building.

700 Tons, La Porte, Ind., additions to buildings, Allis-Chalmers Mfg. Co.

500 Tons, Montgomery, Ill., United Wallpaper Co., factory.

500 Tons, La Crosse, Wis., Northern States Power Co., addition to steam plant.

317 Tons, Los Cervillos, N. M., state highway bridge over Gallisteo River.

290 Tons, Rule, or Old Glory, Tex., state highway bridges.

290 Tons, Harlingen, or San Benito, Tex., state highway bridges.

254 Tons, Estes Park, Colo., Prospect Mountain tunnel, Specification No. 1167, Bureau of Reclamation, Denver, bids due Feb. 26.

225 Tons, Pinto, Tex., T. N. & O. RR bridge 356.08

145 Tons, Estes Park, Colo., Rams Horn tunnel, Specification No. 1167, Bureau of Reclamation, Denver, bids due Feb. 26.

• • • **Reinforcing bar awards** this week included the following:

245 Tons, Louisa County, Iowa, bridges, to Waterloo Steel Co., Waterloo, Iowa.

150 Tons, St. Paul, Minn., State Agriculture Building, to Paper, Calmenson & Co., St. Paul.

• • • **Reinforcing bar inquiries** this week included the following:

568 Tons, Mountain Home, Idaho, Anderson Ranch Dam Power Plant, Bureau of Reclamation, Denver, to Feb. 8.

250 Tons, Buena Vista Co., Iowa, state highway paving, Kranme & Jensen, Des Moines, general contractor.

105 Tons, Santa Barbara Co., Calif., highway construction and two concrete bridges, California Div. of Highways, Dimmitt & Taylor, Los Angeles, general contractor.

British Retain Scrap, Pig Iron Equalization

London

• • • **The British steel** industry is retaining the equalization fund from which individual manufacturers are compensated for the current discrepancy between scrap and pig iron prices. Under this plan a levy is made on all firms of $3.50 per ton of steel ingots produced, and from the resulting fund a payment is made of $7 per ton of pig iron used in steel manufacture.

It has been assumed that all the equalization programs used in the steel industry during the war had either ceased or would do so by the end of March. But the scrap pig iron equalization fund has been retained in order to control scrap prices. This fund is said by the British Iron and Steel Federation to have the approval of each section of the steel industry, both those who use a large percentage of scrap and those who do not. According to the Federation, as the fund is self-supporting, it also has government approval.

Since 1939 the discrepancy between British scrap and pig iron prices has become more marked. But the remission of $7 per ton for the use of pig iron keeps the percentage rise in the two raw materials approximately equal. The position is shown in the following table:

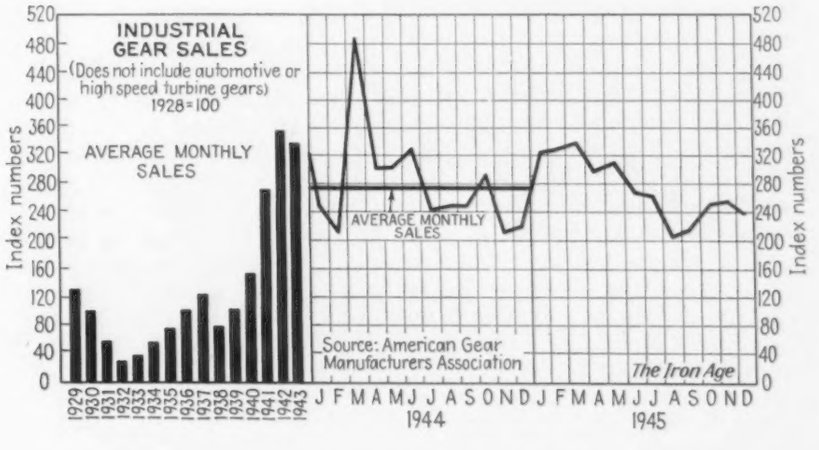
	Representative cost of heavy melting scrap d/d works	Pig iron delivered price
1939	$12.50	$18.50
1946	16.50	31.10
1946 (after deducting pig iron remission)	16.50	24.10
Net increase	4.00	5.10
Net increase..	32 pct	30 pct

It is contended that if this equalization fund were abolished (and scrap prices freed) there would inevitably be an increased demand for scrap as steelmakers turned to it and thus an increase in its price to slightly below the pig iron level. This in its turn might necessitate a further increase of steel prices.

It is not believed by official industry sources that higher scrap prices would result in an increased supply. At present, the great bulk of the supply is home produced. There is a little battle scrap coming from the Continent and it is hoped in time to get additional supplies from Germany, although purchase in Germany would presumably be for payment in dollars. And for home-produced scrap the limiting factor at present is said to be labor and not the price.

DECEMBER GEAR SALES DECREASE

. . . The gearing industry, as represented by the members of the American Gear Manufacturers Assn., shows a decrease in volume of sales for December as compared with November of 6¼ pct. This report does not include turbine or propulsion gearing. The index figure for December was 239.



MACHINE TOOLS

. . . News and Market Activities

WAC Procedures Engender Criticism

Cleveland

• • • **If reports percolating** through the trade can be used as a barometer, it is apparent that few, if any, of the machine tool dealers are satisfied with the manner in which distribution of machine tools through dealer-agencies is being handled, evidenced by the trifling number who have signed up with War Assets Corp.. in some areas, and a feeling on the part of many who have already tried to sell under government egis, that they have been given the run-around.

From all indications, the chief propellant in sending the mercury skyward seems to be the so-called "request form," which a dealer must file with WAC after he succeeds in locating a machine for a customer, in itself, no mean task. This form, according to the trade, serves no readily apparent or functional purpose, other than a marked propensity for getting lost in the shuffle and ultimately gumming up sales. Some sources say that if a dealer actually digs up a machine, turns in a request form, and is about ready to conclude his job is done, he suddenly discovers that no one knows about his request, the machine has been sold to somebody else, and he has lost a sale. Some sources allege that machines have been sold, and not through request forms. In other words, dealers frequently cannot get machines after filing request forms for them. In allied vein, some observers report interminable delays after machines are bought, and if things continue as they are now, dealers will soon lose interest, simply because they're not getting anywhere under the present setup.

A prime example of internecine foolishness was reported in Detroit, where it is alleged that the WAC raised the question as to whether or not the dealers who were about to sign up had pawnbrokers' licenses, which under a statute or local ordinance, is required for dealing in used equipment. It seems unlikely that pawnbrokers' licenses were ever intended to apply to used capital goods, but in any event WAC raised the question and the dealers could not be signed up until the point was clarified. This dispute was finally sent to Washington for clearance. Doubtless there is nothing to this except the delay entailed, which now amounts to about two months, an unholy length of time to decide that doing business with WAC does not make a dealer a pawnbroker.

Whether surplus machine tool disposal will develop into the double - distilled dilemma that seems to be rapidly approaching, depends on the Surplus Property Administration, which is on record as saying through the now-resigned Stuart Symington, that "the Industry Advisory Committee for Machine Tools is an indispensable bridge between surplus machine tools and their prospective users . . . through the Committee can come recommendations, suggestions, complaints . . . from the Committee can go information to the industry that will enable it to understand what, how and why we are selling and to have confidence that we are working with them. . . ."

As matters now stand, SPA's call for 3000 dealers to sign up as agents may easily go unheeded . . . by many who could be of very considerable assistance.

With the builders, a shortage of steel is rapidly closing in on some, along with electric motors, which some segments of the machine tool industry report in tight supply. One builder has indicated that he will be closed down in some departments within two weeks because of a shortage of steel castings.

•

In view of the general labor situation, it was not surprising that a rash of strikes broke out in some areas, including Cincinnati and a couple of spots down east. With wage raising one of the industrial orders of the day, it is doubtful if any of the machine tool builders are expecting any sort of trenchant insularity in the present wage imbroglio and they know that their own scales will soon, if they have not already, come under close scrutiny.

One close observer of the industry here recently predicted that many machines that will ultimately be surplus will not have been turned over to WAC within the next six months. Thus, some segments of the surplus are still in the developmental stage because many lessees are still considering purchasing en masse the equipment used by them during the war, undoubtedly a factor preventing thousands of machines from putting in an appearance. Such sales, naturally, are a delight to SPA.

In the meantime, UNRRA is active, and according to reports, is buying used English machines and sending them to China. Holland has some twenty machines on order with a local producer, but shipment is being delayed because of the rate of exchange, which has not yet been set up.

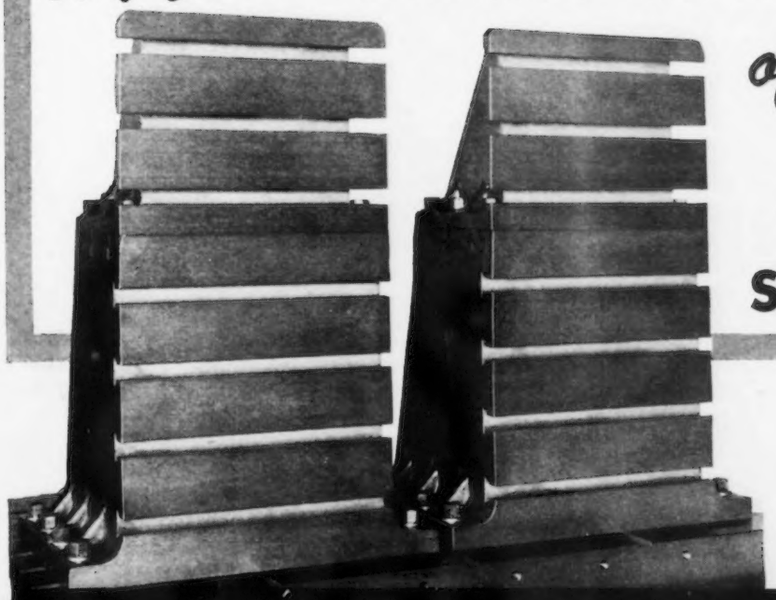
From Australia comes the report that American automatics can be had for early delivery, but the cost is prohibitive. English machines, on the other hand, can be obtained at more reasonable cost but average delivery dates are 12 months. Used machines, especially German makes, are very difficult to obtain.

New Agency: Old Prices

Washington

• • • **OPA has announced** that ceiling prices already established for sales of surplus property by the RFC will also apply to sales of the same items by War Assets Corp. This action, effective Jan. 16, was necessitated by the designation of War Assets Corp. as the disposal agency for surplus property formerly handled by RFC.

A *New* HIGH IN A COMBINATION *of* MATCHED *Angle* STRUCTURES!

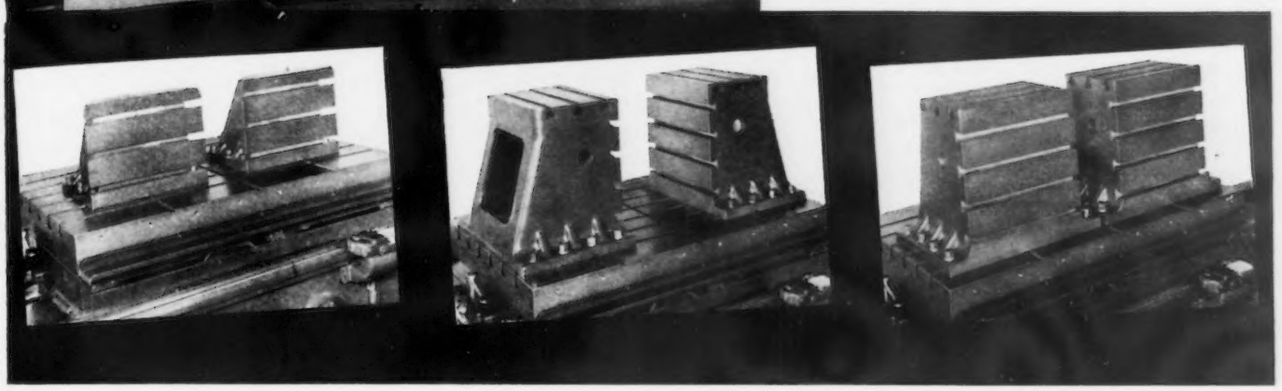


TOP MEMBERS—Vertical Face—12" High, 16" Wide—3 Tee Slots.

BOTTOM MEMBERS—Vertical Face—18¼" High, 16" Wide—4 Tee Slots.

TOP FACE—12" Deep, 16" Wide—3 Tee Slots.

TEE SLOTS—13/16" Wide, 4" Centers.



THIS combination of matched units serves convenience and rigidity for accurately locating and chucking work when boring, milling, planing or for other toolroom and general use. They can be used singly or in variety of combinations for large or small work.

They are machined from box section castings, with Tee slots and flat surfaces in precise alignment.

They are made with the same tooling and quality as the JIGMIL table.

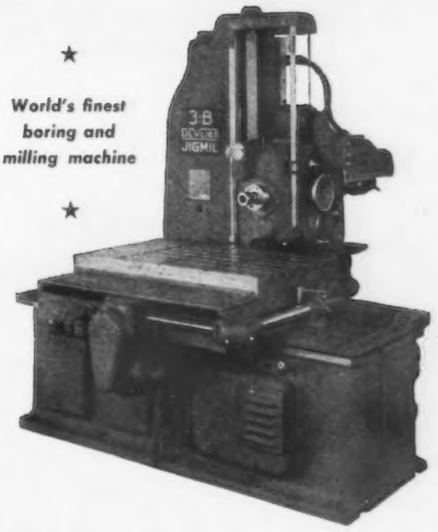
Each set includes Tee slot nuts, studs and screws.

Write for price and delivery!

★

World's finest boring and milling machine

★



DeVLIEG MACHINE COMPANY DEVLIEG JIGMIL **450 FAIR AVE. FERNDALE 20, (Detroit) MICH.**

NONFERROUS METALS

. . . News and Market Activities

Smelters Sign With USWA; Prices Firm

Chicago

• • • **No immediate applications** for price increases will result from signing of contracts by three local smelters and refiners with the United Steel Workers of America, company officials indicate.

R. Lavin & Sons, Inc., H. Kramer Co., and L. A. Cohn & Brothers, Inc., all have signed agreements which essentially meet the 18½c hourly wage advance set as the revised union goal. Negotiations are in progress by the United Mine Workers, district 50, with another district smelter, and wage agreements previously have been reached by the AFL Blacksmiths and Helpers Union with a nonferrous firm at which it is the bargaining agent. This leaves the Federated Metals Div. of American Smelting & Refining Co. at Whiting, Ind., as the only local smelter affected by the strike.

The attitude toward price increases upon the part of firms which have signed the agreement generally envisions a period of operations under the new wage agreements to determine whether applications for increases will be necessary.

Suspension of ceiling prices Nov. 20, 1945, on aluminum smelter's ingot removes any necessity for price increase application in that field, particularly since remelt aluminum has been selling below the former ceiling for some time. However, competitive pressure appears to be sufficiently strong so that directly adding increased labor costs to remelt aluminum prices would be extremely difficult. Smelters of other nonferrous metals have in some cases previously considered price advance applications, but these are in no way connected with the present wage settlement. Competitive pressure is expected to be an important determining factor as to whether price increase applications will be made later for these metals irrespective of increased operating costs.

The steel strike has had little effect upon orders and shipments with the exception of those for deoxidizing aluminum for the steel mills on which shipment has been held up.

Secondary aluminum producers find shipments holding up beyond expectations voiced prior to the end of the war. Carl Burton of the Aluminum Research Institute expects shipments to be at 75 pct of the war time peak for the balance of 1946, with prospect of an increase later.

o o o

Cadmium Restricted To 30-Day Inventory

Washington

• • • **CPA has again** placed restrictions on the consumption of cadmium because of the excess of demand over supply and a severe drain on the government stockpile. Effective Feb. 1, manufacturers were permitted to use 90 pct of the amount of cadimum they used in 1941. At the same time, CPA announced that inventory restrictions on the metal have been tightened. Manufacturers are now allowed a 30 day inventory of cadmium instead of the 45 days previously permitted. The consumption restrictions are contained in Order M-389, and the inventory limitations in an amendment of Table 1 of Priorities Regulation 32, both issued today.

Cadmium consumption since the end of the war has been greater than all expectations and predictions, CPA officials said. They reported that from Sept. 1, 1945, until Jan. 1, 1946, releases from government stockpiles amounted to 529,600 lb. It is estimated that during the same period producers' inventories have decreased 100,000 lb which indicates that consumption during that period exceeded production by 629,000 lb. The government stockpile of cadmium dropped to 846,300 lb on Jan. 1, 1946, from 1,375,900 lb on Sept. 1, 1945, CPA disclosed.

Cadmium is being produced at the rate of 8,000,000 lb per year and consumption in 1940, the last full year of peacetime production, was only 6,000,000 lb.

•

Will Buy Foreign Copper

Washington

• • • **Acting upon the** request of OWMR and upon the recommendation of CPA, a foreign public copper purchase program is being reestablished by the Office of Metals Reserve. The original program was discontinued in October 1945.

RFC said that OWMR plans to purchase copper of foreign source during the first six months of 1946 at the rate of 20,000 tons a month. The total quantity, 120,000 tons, is in addition to any commitments presently outstanding for the public purchase of foreign copper.

•

Tests Aluminum Homes

Pontiac, Mich.

• • • **Two experimental homes** of aluminum are being built here under the auspices of the Pontiac Economic Development Committee, intended to provide housing for returning veterans.

Approximately one-third of all wood ordinarily used in frame houses is replaced in the experimental models by 20 gage rolled aluminum siding, 3S or 52S, used for siding, sheeting and roofing. The sheets are fastened to wooden bases using a lock joint and blind nailing, intended to eliminate rusting of nailed areas.

Designing details contain provisions for insulation features to offset any ill effect which might result from the use of metal walls. The houses are designed to sell for about $4,000.

•

Alcoa Ups Foil Production

Pittsburgh

• • • **The Aluminum Co.** of America has announced the expansion of aluminum foil-making facilities at its Alcoa, Tenn.; New Kensington, Pa.; and Edgewater, N. J., plants. The construction program is expected to be completed during the latter half of the year.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, del'd (Min. 10,000 lb)	15.00
Aluminum pig	14.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be	$17.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$ 2.25
Iridium, dollars per troy oz.	$90-$100
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$103 to $106
Nickel, electro	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per oz.	$35.00
Silver, New York, cents per oz.	70.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65

Remelted Metals

(Cents per lb)

Aluminum, No. 12 Fdy. (No. 2)	9.00 to 10.00
Aluminum, deoxidizing No. 2, 3, 4	7.25 to 10.00
Brass Ingot	
85-5-5-5 (No. 115)	18.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb)

	Extruded Shapes	Rods	Sheets
Copper	20.87	....	20.37
Copper, H.R.	....	17.37	....
Copper drawn	....	18.37	....
Low brass, 80%	....	20.40	20.15
High brass	....	....	19.48
Red brass, 85%	....	20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	....	15.01	....
Commercial bronze, 90%	....	21.32	21.07
Commercial bronze, 95%	....	21.53	21.28
Manganese bronze	24.00	....	28.00
Phos. bronze, A, B, 5%	....	36.50	36.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculoy, Olympic or equal	....	25.50	26.00
Nickel silver, 5%	....	28.75	26.50
Architect bronze	19.12	....	....

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c.

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals; ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 34c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths, 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

NONFERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.00
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.00
Automobile radiators	7.25
Zincy bronze borings	7.00
Zincy bronze solids	8.00

OPA Group 3†

Fired rifle shells	8.00
Brass pipe	7.25
Old rolled brass	6.75
Admiralty condenser tubes	7.25
Muntz metal condenser tubes	6.75
Plated brass sheet, pipe reflectors	6.25
Manganese bronze solids	7.00[1]
Manganese bronze solids	6.00[2]
Manganese bronze borings	6.25[1]

OPA Group 4†

Refinery brass	4.50*

*Price varies with analysis, [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

Other Copper Alloys

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

Aluminum*

Plant scrap, segregated

2S solids	8.00
Dural alloys, solids 14, 17, 18, 24S	4.00
25S turnings, dry basis	3.00
Low copper alloys 51, 52, 61, 63S solids	7.25
turnings, dry basis	5.75

Plant scrap, mixed

Solids	4.00
Turnings, dry basis	2.75

Obsolete scrap

Pure cable	8.00
Old sheet and utensils	6.00
Old castings and forgings	5.00
Pistons, free of struts	5.00
Pistons, with struts	3.00
Old alloy sheet	5.00

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	6.50
Engravers, lithographers plates	6.50
Old zinc scrap	4.75
Unsweated zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.45
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ½%, 23¢ per lb.; 90 to 98% Ni, 23¢ per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point in 500 lb. lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	25½
Electrodeposited	18⅞
Rolled, oval, straight	19½
Curved	20⅜
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	23¾
Zinc, cast, 99.99, 15 in. or longer	16¼
Nickel, 99 per cent plus, frt. allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 100 oz. lots, per oz.	80

Chemicals

(Cents per lb., f.o.b. shipping point)

Copper cyanide, 1-5 bbls.	34.00
Copper sulphate, 99.5, crystals, bbls.	7.75
Nickel salts, single, 425 lb. bbls., frt. allowed	13.50
Silver Cyanide, 100 oz. lots, per oz.	0.6083
Sodium cyanide, 96 per cent, domestic, 100 lb. drums	15.00
Zinc cyanide, 100 lb. drums	33.00
Zinc sulphate, 89 per cent, crystals, bbls., frt. allowed	6.35

SCRAP

. . . News and Market Activities

Market Firm Despite Steel Shutdown

New York

• • • Despite the slump in shipments of scrap to mills during the strike, there seems to be no oversupply of scrap in any market district. While certain mills have made arrangements to continue the acceptance of scrap, in most cases prepared only, at their plant

(*Additional scrap news on page* 125.)

or at other locations, in general, receipts of scrap at mills have ceased.

Nevertheless, there is no significant easing of the market and there are reports that present conditions bode ill for future scrap supplies. One factor that has made a significant contribution to this condition is the cessation of all industrial scrap production.

•

PITTSBURGH—While the total demand for scrap has gone down appreciably since the beginning of the steel strike, the mills that are working in this area, as well as the foundries, are doing an excellent job of absorbing what is being offered. There are no heavy accumulations for two reasons. First, scrap demand is fairly brisk and, second, many of the industrial scrap producers are likewise tied up with strikes or are closing for lack of materials. One of the heaviest producers, Westinghouse, has been on strike longer than the steel mills.

•

CHICAGO—Orders to stop shipments on all but prime openhearth grades by two principal consumers reported last week have failed to affect general market strength even in the grades involved. Shipments are off about 50 pct overall as production slows down at scrap producing plants. Some strength has been shown in certain alloy grades particularly in the 4000 series, but interest in triple alloys continues lukewarm. General sentiment is that considerable termination scrap remains to be disposed of.

•

PHILADELPHIA—Only two mills in this area are taking scrap during the strike and they are not being flooded with supplies. Scrap is moving to Pittsburgh out of northern Jersey and New York at a freight of $5.83, and some out of this area at $5.60. This does not appear promising for supplies here when local mills begin ordering again. Cast scrap is tighter than ever, and some small foundries are reported to be picking up scrap in their own trucks. Foundries are reported to be upping their freight allowances and fantastic figures of $10 to $12 are being mentioned. All grades are at ceilings.

•

DETROIT—Demand continues without abatement. Meanwhile, production is still slipping off so the situation is tighter than it has been. Cast grades are particularly scarce. Local dealers and brokers see little hope for early alleviation of the situation.

•

BOSTON—Scrap is moving to Pennsylvania and Maryland points when available. Both prepared and unprepared heavy steel is extremely short and supplies of borings and turnings inadequate with indications of further curtailed supplies this week. Demand for foundry scrap is unabated. Skimpy pig iron supplies necessitate greater percentages of scrap in mixtures. A few foundries say they may be forced to close within a fortnight.

•

NEW YORK—Scrap continues firm here although some mills are not taking scrap because of the strike. The Bethlehem Steel Co. is accepting deliveries at storage yards away from its plants. While the overall picture for scrap supply when the strike is over looks unpromising, it is considered by some dealers that the approaching spring may increase the supply of scrap.

•

BUFFALO—Some interests here are instructing scrapyards to prepare scrap and hold it for their account while steelplants are shut down. While this does not constitute a firm order, it is expected that brokers and dealers will cooperate. Yards are encountering extra handling costs in following such a procedure. The volume of production scrap has again dropped this week.

•

CLEVELAND—With shipments gradually coming to a halt, the scrap market has entered a period of watchful waiting, apparently for some new slant in the steel strike. All scrap activity has fallen off in comparison with last week, and some consumers have indicated that if the steel strike continues much longer, their inventories will be in topheavy shape, a circumstance they have not had to deal with for some time. Scrap is showing some activity at Youngstown and Warren, but this is not expected to continue indefinitely in view of the inventory condition. In the virtual absence of production scrap, termination inventory material is in the spotlight and at high prices.

•

BIRMINGHAM—Mills in this district are remaining in the market for openhearth and blast furnace grades with delivery to be made as soon as railroads lift an embargo placed against the mills to prevent a tieup of railroad equipment. Foundries are maintaining strong demand for cast grades but supplies are scarce.

•

CINCINNATI—Brokers and dealers indicate no great change in the iron and steel scrap market, in this area, they report that scrap is moving from mills and foundries within the limit of the present available material. One large steel industry in the area is still producing, and another is still taking in scrap. Demand for cupola material continues to be strong, with all available material being taken up.

Dealer's yards are fairly empty since practically all material coming into the yards is almost immediately moved on contract.

•

TORONTO—Scrap iron and steel shortages are becoming more serious in the Canadian markets and dealers do not look for improvement until winter conditions pass next April or May. Shipments of scrap from western Canada and the mining centers to the north have been suspended, and only occasional small lots are appearing from rural districts, with the result that dealers are dependent almost entirely on industrial plants for scrap supply. While there were hopes that the steel strike in the United States would swing larger tonnages of American scrap into the Canadian markets this has not materialized and imports are well below former average levels. Steel mills are rapidly depleting stockpiles and it is estimated that within a month or six weeks they will be out of supplies. Foundry interests are obtaining only small lots of iron scrap and the majority are making greater use of pig iron to fill in. Ceiling prices prevail on all scrap.

Keystone Continues Output

Peoria, Ill.

• • • Its plant unaffected by the general steel strike, Keystone Steel & Wire Co. reported capacity operations in its quarterly statement.

The company recently granted a 12½¢ an hr wage increase to its employees, who are affiliated with the Independent Steel Workers Alliance, subject to adjustment to rates finally established generally in the steel industry.

For the quarter ended Dec. 31, the company showed net income of $537,329 compared to $481,003 the corresponding period of 1944. For the six months ended Dec. 31, the company earned $822,468 compared to $787,454 in the corresponding 1944 period.

Keystone reported ability to book orders for its entire output as far in advance as is considered desirable.

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Where asterisks are used on quotations below, this indicates a ceiling price to which must be added brokerage fee and adjusted freight.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bdld. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	15.00*
Short shov. turn.	17.00*
Mixed bor. and turn.	15.00*
Cast iron borings	16.00*
Hvy. break cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	13.75*
Short shovels, turn.	15.75*
Cast iron borings	14.75*
Mix. borings & turn.	13.75*
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Angles & splice bars	22.25*
Locomotive tires, cut	24.25*
Cut bolsters & side frames	22.25*
Standard stl. car axles	25.75*
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast.	20.00*
Rails 3 ft. and under	22.25*
No. 1 agricul. cast.	20.00*
Hvy. breakable cast.	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast.	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	$10.50 to 11.00
Shoveling turn.	12.50 to 13.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn.	11.50 to 12.00
Low phos. plate	22.00*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast.	20.00*
Cast iron carwheels	20.00*

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$15.05*
No. 2 hvy. melting	15.05*
No. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shovelings	12.05*
Machine shop turn.	10.05*
Mixed bor. & turn.	10.05*
Cl'n cast, chem. bor.	$13.06 to 14.15*

Truck delivery to foundry

Machinery cast.	21.00 to 23.51*
Breakable cast	21.57 to 21.87*
Stove plate	20.00 to 23.51*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	12.32*
Short shov. turn.	14.32*
Cast iron borings	13.32*
Mixed bor. & turn.	12.32*
Low phos. plate	19.82*
No. 1 cupola cast	20.00*
Charging box cast	19.00*
Hvy. breakable cast	16.50*
Stove plate	19.00*
Automotive cast	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	14.75*
Mixed bor. & turn.	13.75*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Cast, charging box	19.00*
Hvy. axle forge turn.	18.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting	$17.50*
Bundled sheets	17.50*
Mach. shop turn.	13.50*
Locomotive tires, uncut	$18.50 to 19.00
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft. and under	21.50*
RR. springs	22.00*
Steel car axles	24.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 mach'ery cast	20.00*
Breakable cast	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	12.00*
Shoveling turnings	14.00*
Cast iron borings	13.00*
Bar crops and plate	$18.50 to 19.50*
Structural and plate	18.50 to 19.50*
No. 1 cast	20.00*
Stove plate	19.00*
Steel axles	18.50*
Scrap rails	18.50
Rerolling rails	20.50*
Angles & splice bars	20.50 to 21.00
Rails 3 ft. & under	21.00*
Cast iron carwheels	17.50 to 18.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	15.00*
Short shovel. turn.	17.00*
Cast iron borings	16.00*

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*
Shoveling turn.	12.33*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Charging box cast	19.00*
Store plate	19.00*
Clean auto cast	20.00*
Unstrip. motor blks.	17.50*
Cl'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shoveling turn.	16.25*
Cast iron borings	14.25*
Cast iron borings	16.25*
Mixed bor. & turn.	14.25*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00
No. 2 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel.	16.50*
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting	$15.00 to 15.75
No. 1 hvy. melting	15.00 to 15.75
No. 2 hvy. melting	14.00 to 14.75
No. 2 bales	12.50 to 13.25
No. 3 bales	8.50 to 9.25
Mach. shop turn.	7.00
Elec. furn. 1 ft. und.	15.50 to 17.00
No. 1 cupola cast	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$13.00 to $14.25
No. 2 hvy. melting	12.00 to 13.25
No. 1 bales	12.00 to 13.00
No. 2 bales	11.00 to 12.00
No. 3 bales	8.00 to 9.00
Mach. shop turn.	4.50
No. 1 cupola cast	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting	$10.00
No. 1 & No. 2 hvy. melting	10.00
Elec. furn. 1 ft. und.	$14.00 to 15.00
No. 1 cupola cast	20.00*

HAMILTON, ONT.

Per gross ton delivered to consumer:

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

Comparison of Prices . .

Advances over past week in **Heavy Type**; declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Feb. 5, 1946	Jan. 29, 1946	Jan. 1, 1946	Feb. 6, 1945
Hot-rolled sheets	2.20	2.20	2.20	2.10
Cold-rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.70	3.70	3.70	3.50
Hot-rolled strip	2.10	2.10	2.10	2.10
Cold-rolled strip	2.80	2.80	2.80	2.80
Plates	2.25	2.25	2.25	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c-r strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tinplate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.25	2.25	2.25	2.15
Cold-finished bars	2.75	2.75	2.75	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (cents per pound)				
Bright wire	2.75	2.75	2.75	2.60
Wire nails	2.90	2.90	2.90	2.55
Rails: (dollars per gross ton)				
Heavy rails	$43.00	$43.00	$43.00	$40.00
Light rails	45.00	45.00	45.00	40.00
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$36.00	$36.00	$36.00	$34.00
Sheet bars	36.00	36.00	36.00	34.00
Slabs, rerolling	36.00	36.00	36.00	34.00
Forging billets	42.00	42.00	42.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.15	2.15	2.15	2.00
Skelp	1.90	1.90	1.90	1.90

Pig Iron: (per gross ton)	Feb. 5, 1946	Jan. 29, 1946	Jan. 1, 1946	Feb. 6, 1945
No. 2 foundry, Phila.	$27.59	$27.59	$27.59	$25.84
No. 2, Valley furnace	25.75	25.75	25.75	24.00
No. 2, Southern, Cin'ti	26.19	26.19	26.19	24.44
No. 2, Birmingham	22.13	22.13	22.13	20.38
No. 2 foundry, Chicago†	25.75	25.75	25.75	24.00
Basic, del'd eastern Pa.	27.09	27.09	27.09	25.34
Basic, Valley furnace	25.25	25.25	25.25	23.50
Malleable, Chicago†	25.75	25.75	25.75	24.00
Malleable, Valley	25.75	25.75	25.75	24.00
L. S. charcoal, Chicago	42.34	42.34	42.34	37.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.32
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$7.50	$7.50	$7.50	$7.00
Foundry coke, prompt	9.00	9.00	9.00	8.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin, Straits, New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

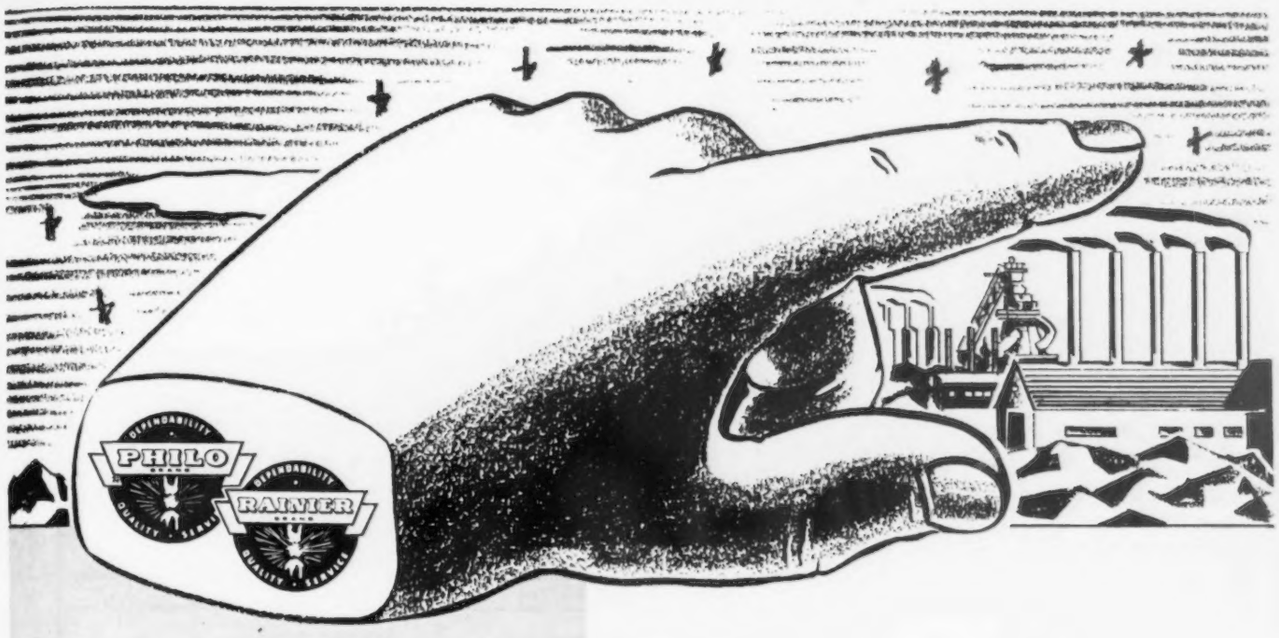
	FINISHED STEEL	PIG IRON	SCRAP STEEL
Feb. 5, 1946	2.44076¢ per lb.	$25.37 per gross ton	$19.17 per gross ton
One week ago	2.44076¢ per lb.	$25.37 per gross ton	$19.17 per gross ton
One month ago	2.44076¢ per lb.	$25.37 per gross ton	$19.17 per gross ton
One year ago	2.38444¢ per lb.	$23.61 per gross ton	$19.17 per gross ton

	FINISHED STEEL HIGH		FINISHED STEEL LOW		PIG IRON HIGH		PIG IRON LOW		SCRAP STEEL HIGH		SCRAP STEEL LOW	
1945	2.44076¢	Oct. 2	2.38444¢	Jan. 2	$25.37	Oct. 23	$23.61	Jan. 2	$19.17		$19.17	
1944	2.30837¢	Sept. 5	2.21189¢	Oct. 5	$23.61		$23.61		19.17		$15.67	Oct. 24
1943	2.25513¢		2.25513¢		23.61		23.61		19.17		$19.17	
1942	2.26190¢		2.26190¢		23.61		23.61		19.17		19.17	
1941	2.43078¢		2.43078¢		$23.61	Mar. 20	$23.45	Jan. 2	$22.00	Jan. 7	$19.17	Apr. 10
1940	2.30467¢	Jan. 2	2.24107¢	Apr. 16	23.45	Dec. 23	22.61	Jan. 2	21.83	Dec. 30	16.04	Apr. 9
1939	2.35367¢	Jan. 3	2.26689¢	May 16	22.61	Sept. 19	20.61	Sept. 12	22.50	Oct. 3	14.08	May 16
1938	2.58414¢	Jan. 4	2.27207¢	Oct. 18	23.25	June 21	19.61	July 6	15.00	Nov. 22	11.00	June 7
1937	2.58414¢	Mar. 9	2.32263¢	Jan. 4	23.25	Mar. 9	20.25	Feb. 16	21.92	Mar. 30	12.67	June 8
1936	2.32263¢	Dec. 28	2.05200¢	Mar. 10	19.74	Nov. 24	18.73	Aug. 11	17.75	Dec. 21	12.67	June 9
1935	2.07642¢	Oct. 1	2.06492¢	Jan. 8	18.84	Nov. 5	17.83	May 14	13.42	Dec. 10	10.33	Apr. 29
1934	2.15367¢	Apr. 24	1.95757¢	Jan. 2	17.90	May 1	16.90	Jan. 27	13.00	Mar. 13	9.50	Sept. 25
1933	1.95578¢	Oct. 3	1.75836¢	May 2	16.90	Dec. 5	13.56	Jan. 3	12.25	Aug. 8	6.75	Jan. 3
1932	1.89196¢	July 5	1.83901¢	Mar. 1	14.81	Jan. 5	13.56	Dec. 6	8.50	Jan. 12	6.43	July 5
1931	1.99626¢	Jan. 13	1.86586¢	Dec. 29	15.90	Jan. 6	14.79	Dec. 15	11.33	Jan. 6	8.50	Dec. 29
1930	2.25488¢	Jan. 7	1.97319¢	Dec. 9	18.21	Jan. 7	15.90	Dec. 16	15.00	Feb. 18	11.25	Dec. 9
1929	2.31773¢	May 28	2.26498¢	Oct. 29	18.71	May 14	18.21	Dec. 17	17.58	Jan. 29	14.08	Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.



a firm purpose . . . faithfully maintained . . . to improve your product

FERRO SILICON 50%, 75%, 85%, 90%
H. C. FERRO CHROMIUM • FERRO MANGANESE
BOROSIL • SIMANAL

BRIQUETS
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The way to better production is no secret . . . it is the result of unceasing research and development. Ohio Ferro-Alloys is continually searching for new or improved ferro-alloy products and processing methods, experimenting both in the laboratory and in actual iron and steel production. Typical example of development research by Ohio Ferro-Alloys is the patented metalcast process of producing ferro silicon.

As in the past, so in the years to come—look to Ohio Ferro for quality in ferro-alloy production—for the benefit of the iron and steel industry as a whole.

PHILO RAINER

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Ohio Ferro-Alloys Corporation
Canton, Ohio

Chicago Detroit Pittsburgh San Francisco Tacoma

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb. to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15c. per lb higher.

Basing Points	Pitts-burgh	Chicago	Gary	Cleve-land	Birm-ingham	Buffalo	Youngs-town	Spar-rows Point	Granite City	Middle-town, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO Detroit	New York	Phila-delphia
INGOTS															
Carbon, rerolling	($31.00 f.o.b. mill)														
Carbon, forging	$36	$36	$36	$36	$36	$36	$36								
Alloy	$45	$45				$45	(Bethlehem, Massillon, Canton, Coatesville—$45)								
BILLETS, BLOOMS, SLABS							(Provo—$47.20, Duluth—$38[14])								
Carbon, rerolling	$36	$36	$36	$36	$36	$36	$36	$36				$48[14]	$38		
							(Provo—$53.20, Duluth—$44[14])								
Carbon, forging	$42	$42	142	$42	$42	$42	$42					$54[14]	$44		
Alloy	$54	$54				$54	(Bethlehem, Massillon, Canton—$54)						$56		
SHEET BARS	$36	$36		$36		$36	$36	$36	(Canton—$36)						
PIPE SKELP	1.90¢	1.90¢					1.90¢	1.90¢	(Coatesville—1.90¢)						
WIRE RODS[15]															
No. 5 to 9/32 in.	2.15¢	2.15¢		2.15¢	2.15¢	(Worcester—2.25¢)					2.40¢	2.65¢			
SHEETS															
Hot-rolled	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.30¢	2.20¢		2.75¢	2.30¢	2.44¢	2.37¢
Cold-rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 gage)	3.70¢	3.70¢	3.70¢		3.70¢	3.70¢	3.70¢	3.70¢	3.80¢	3.70¢		4.25¢		3.94¢	3.87¢
Enameling (20 gage)	3.45¢	3.45¢	3.45¢	3.45¢			3.45¢		3.55¢	3.45¢		4.10¢	3.55¢	3.81¢	3.77¢
Long ternes[2]	3.80¢	3.80¢	3.80¢									4.55¢		4.16¢	4.12¢
STRIP															
Hot-rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold-rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester—3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity cold-rolled	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester—3.35¢)					3.05¢	3.31¢	
TINPLATE															
Standard cokes, base box	$5.00	$5.00	$5.00		$5.10			$5.10	$5.10					$5.35	$5.28
Electro, box 0.25 lb	$4.35	$4.35	$4.35					$4.45							
Electro, box 0.50 lb	$4.50	$4.50	$4.50					$4.60	$4.60						
Electro, box 0.75 lb	$4.65		$4.65					$4.75	$4.75						
BLACKPLATE															
29 gage[5]	3.05¢	3.05¢	3.05¢					3.15¢	3.15¢			4.05¢[11]			3.32¢
TERNES, MFG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25	(Duluth—2.35¢, Provo, Utah 2.95¢)			2.60¢	2.90¢	2.35¢	2.59¢	2.57¢
Rail steel[6]	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢					2.60¢	2.90¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold-finished[8]	2.75¢	2.75¢	2.75¢	2.75¢		2.75¢			(Detroit—2.80¢)		(Toledo—2.90¢)			3.09¢	3.07¢
Alloy, hot-rolled	2.70¢	2.70¢				2.70¢	2.70	(Bethlehem, Massillon, Canton—2.70¢)					2.80¢		
Alloy, cold-drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
PLATES								(Coatesville and Claymont—2.25¢, Provo, Utah 2.95¢)							
Carbon steel[13]	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢		2.25¢	2.25¢			2.60¢	2.80¢	2.47¢	2.44¢	2.30¢
Floor plates	3.50¢	3.50¢									3.85¢	4.15¢		3.86¢	3.82¢
Alloy	3.50¢	3.50¢			(Coatesville—3.50¢)						3.95¢	4.15¢		3.70¢	3.59¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem—2.10¢)				2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 carbon	2.80¢			2.80¢			(Worcester—3.00¢)								
0.51 to 0.75 carbon	4.30¢			4.30¢			(Worcester—4.50¢)								
0.76 to 1.00 carbon	6.15¢			6.15¢			(Worcester—6.35¢)								
1.01 to 1.25 carbon	8.35¢			8.35¢			(Worcester—8.55¢)								
WIRE[9]															
Bright[12]	2.75¢	2.75¢		2.75¢	2.75¢		(Worcester—2.85¢)		(Duluth—2.80¢)			3.25¢			3.07¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire base														
Spring (high carbon)	3.35¢	3.35¢		3.35¢			(Worcester—3.45¢)					3.85¢			3.67¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

CORROSION AND HEAT RESISTANT STEELS

in cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt	21.25	20.40	15.725	16.15	19.125	23.375
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	21.25	20.40	15.725	16.15	19.125	23.375
Billets, P'gh, Chi, Canton, Newark, N. J., Watervliet, Syracuse, Balt	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Newark, N. J., Ft. Wayne, Titusville	21.25	20.40	15.725	16.15	19.125	23.375
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	25.00	24.00	18.50	19.00	22.50	27.50
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	25.00	24.00	18.50	19.00	22.50	27.50
Plates, P'gh, Middletown, Canton	29.00	27.00	21.50	22.00	26.50	30.50
Shapes, structural, P'gh, Chi	25.00	24.00	18.50	19.00	22.50	27.50
Sheets, P'gh, Chi, Middletown, Canton, Balt	36.00	34.00	26.50	29.00	32.50	36.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	23.50	21.50	17.00	17.50	24.00	35.00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	30.00	28.00	22.00	22.50	32.00	52.00
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila	25.00	24.00	18.50	19.00	22.50	27.50
Wire flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	30.00	28.00	22.00	22.50	32.00	52.00
Rod, h-r, Newark, N. J., Syracuse	25.00	24.00	18.50	19.00	22.50	27.50
Tubing, seamless, P'gh, Chi, Canton, (4 in. to 8 in.)	66.63	66.63	.....	63.30	.....	.....

SHELL STEEL

	per gross ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic openhearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.00 higher; East Michigan, $3 higher.

Price Exceptions: Follansbee Steel Corp. permitted to sell at $13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of $52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	3.30¢
Armature	3.65¢
Electrical	4.15¢
Motor	5.05¢
Dynamo	5.75¢
Transformer 72	6.25¢
Transformer 65	7.25¢
Transformer 58	7.75¢
Transformer 52	8.55¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., gross ton	$43.00
Angle splice bars, 100 lb	2.70
(F.o.b. basing points)	*per gross ton*
Light rails (from billets)	$45.00
Light rails (from rail steel)	44.00
	base per lb
Cut spikes	3.25¢
Screw spikes	5.40¢
Tie plate, steel	2.30¢
Tie plates, Pacific Coast	2.45¢
Track bolts	4.75¢
Track bolts, heat treated, to railroads	5.00¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk)

(*Also Canton, O.)	*base per lb*
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

CLAD STEEL

Base prices, cents per pound

	Plate	*Sheet*
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa.	18.00*	19.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	18.00	....
Inconel-clad		
10 pct, f.o.b. Coatesville	25.00	....
Monel-clad		
10 pct, f.o.b. Coatesville	24.00	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	*Pacific Coast Basing Points†*
	base per keg	
Standard wire nails	$2.90	$3.40
Coated nails	2.90	3.40
Cut nails, carloads	3.85	....
	base per 100 lb	
Annealed fence wire	$3.20	$3.70
Annealed galv. fence wire	3.55	4.05
	base column	
Woven wire fence*	67	85
Fence posts, carloads	69	86
Single loop bale ties	66	91
Galvanized barbed wire**	72	93
Twisted barbless wire	72	....

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$6.00	$12.00
15-lb coating I.C.	7.00	14.00
20-lb coating I.C.	7.50	15.00

ALLOY EXTRAS

Alloy Steel	Basic Openhearth		Electric Furnace	
	Bars and Bar-strip	Billets, Blooms and Slabs	Bars and Bar-strip	Billets, Blooms, and Slabs
NE 8600	0.65¢	$13.00	$1.15	$23.00
NE 8700	0.70	14.00	1.20	24.00
NE 9400	0.75	15.00	1.25	25.00
NE 9700	0.65	13.00	1.15	23.00
NE 9800	1.30	26.00	1.80	36.00
NE 9900	1.20	24.00	1.55	31.00

The extras shown are in addition to the base price of $2.70 per 100 lb on finished products and $54 per gross ton on semifinished steel, major basing points, as shown in table, opposite page, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. When acid openhearth is specified and acceptable, add to basic openhearth alloy differential 0.25¢ per lb for bars and bar-strip and $5 per gross ton for billets, blooms and slabs.

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe) base price—$200.00 per net ton

Steel (buttweld)

	Black	Galv.
⅛-in.	63½	51
¼-in	66½	55
1-in. to 3-in.	68½	57½

Wrought Iron (buttweld)

⅛-in.	24	3½
¼-in.	30	10
1-in. and 1¼-in.	34	16
1½-in.	38	18½
2-in.	37½	18

Steel (lapweld)

2-in.	61	49½
2½-in. and 3-in.	64	52½
3½-in. to 6-in.	66	54½

Wrought Iron (lapweld)

2-in.	30½	12
2½-in. to 3½-in.	31½	14½
4-in.	33½	18
4½- in. to 8-in.	32½	17

Steel (butt, extra strong, plain ends)

⅛-in.	61½	50½
¼-in.	65½	54½
1-in. to 3-in.	67	57

Wrought Iron (same as above)

⅛-in.	25	6
¼-in.	31	12
1-in. to 2-in.	38	19½

Steel (lap, extra strong, plain ends)

2-in.	59	48½
2½-in. and 3-in.	63	52½
3½-in. to 6-in.	66½	56

Wrought Iron (same as above)

2-in.	33½	15½
2½-in. to 4-in.	39	22½
4½-in. to 6-in.	37½	21

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or $2 a ton higher on all buttweld.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, Chicago, in carload lots

	Seamless Cold-Drawn	Seamless Hot-Rolled	Lap-weld, Hot-Rolled
2 in. O.D. 13 B.W.G.	15.03	13.04	12.38
2½ in. O.D. 12 B.W.G.	20.21	17.54	16.58
3 in. O.D. 12 B.W.G.	22.48	19.50	18.35
3½ in. O.D. 11 B.W.G.	28.37	24.62	23.15
4 in. O.D. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb or ft and over	Base
30,000 lb or ft to 39,999 lb or ft	5 pct
20,000 lb or ft to 29,999 lb or ft	10 pct
10,000 lb or ft to 19,999 lb or ft	20 pct
5,000 lb or ft to 9,999 lb or ft	30 pct
2,000 lb or ft or 4,999 lb or ft	45 pct
Under 2,000 lb or ft	65 pct

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago.....$54.80
6-in. and larger, del'd New York... 52.20
6-in. and larger, Birmingham..... 46.00
6-in. and larger, f.o.b. cars, San Francisco or Los Angeles..... 69.40
6-in. and larger f.o.b. cars, Seattle. 71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect 3 pct tax on freight rates.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

Percent Off List

½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 in. through 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 pct additional discount.

Stove Bolts

Consumer

Packages, nuts loose	71 and 10
In packages	71
In bulk	80

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

(½ in. and larger)

Base per 100 Lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets

(7/16 in. and smaller)

Percent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham ..... 65 and 5

Cap and Set Screws	*Consumer Percent Off List*
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes.	36
Fillister head cap, listed sizes.	51

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Div. certifies in writing the consumers need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, cents per lb, ton lots.

Copper, electrolytic, 150 and 200 mesh	21½¢ to 23½¢
Copper, reduced, 150 and 200 mesh	20½¢ to 25½¢
Iron, commercial, 100 and 200 mesh 96 + % Fe	12½¢ to 15¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	4¢
Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots	63¢
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe	30 to 33¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	42¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢
Aluminum, 100 and 200 mesh	*25¢
Antimony, 100 mesh	30¢
Cadmium, 100 mesh	$1.40
Chromium, 100 mesh and finer	$1.25
Lead, 100, 200 & 300 mesh	11½ to 15¢
Manganese	65¢
Nickel, 150 mesh	51½¢
Solder powder, 100 mesh	8½¢ plus metal
Tin, 100 mesh	58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb.	$2.60
Molybdenum powder, 99%, in 200-lb kegs, f.o.b. York, Pa., per lb.	$2.60
Under 100 lb	$3.00

*Freight allowed east of Mississippi.

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$7.50*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	9.00
Foundry, Byproduct	
Chicago, del'd	13.75
Chicago, f.o.b.	13.00
New England, del'd	14.65
Kearny, N. J., f.o.b.	13.05
Philadelphia, del'd	13.28
Buffalo, del'd	13.40
Portsmouth, Ohio, f.o.b.	11.50
Painesville, Ohio, f.o.b.	12.15
Erie, del'd	13.15
Cleveland, del'd	13.20
Cincinnati, del'd	13.25
St. Louis, del'd	13.75†
Birmingham, del'd	10.90

*Hand drawn ovens using trucked coal permitted to charge $8.60 per ton plus transportation charges.

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of $14.25 in the St. Louis, Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	*Per 1000*
Super-Duty brick, St. Louis	$68.50
First quality, Pa., Md., Ky., Mo., Ill.	54.40
First quality, New Jersey	59.35
Sec. quality, Pa., Md., Ky., Mo., Ill.	49.35
Sec. quality, New Jersey	51.95
No. 1 Ohio	45.60
Ground fire clay, net ton	8.05
Silica Brick	
Pennsylvania and Birmingham	$54.40
Chicago District	62.45
Silica cement, net ton (Eastern)	9.55
Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00
Magnesite Brick	
Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00
Grain Magnesite	
Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$43.45
Domestic, f.o.b. Chewelah, Wash. in bulk	22.00
in sacks	26.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)*

Per Gross Ton

Old range, bessemer, 51.50	$4.95
Old range, non-bessemer, 51.50	4.80
Mesaba, bessemer, 51.50	4.70
Mesaba, non-bessemer, 51.50	4.55
High phosphorus, 51.50	4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
**Philadelphia	$3.518	$4.872[5]	$4.868[a]	$3.922	$4.772	$3.605	$3.666	$3.822	$4.172	$5.816	$8.866	$7.072	$8.172
New York	3.59	4.613	5.210	3.974[6]	4.772	3.768	3.758	3.853	4.203	5.858	6.908	7.103	8.203
Boston	3.744	4.744[9]	5.324[9]	4.106	4.715	3.912	3.912	4.044	4.244	6.012	7.062	7.194	8.394
Baltimore	3.394	4.852	4.994	3.902	4.752	3.594	3.759	3.802	4.152	....	....	....	....
Norfolk	3.771	4.965	5.471	4.165	4.865	3.971	4.002	4.065	4.265	....	....	....	....
Chicago	3.25	4.20	5.331	3.60	4.65[17]	3.55	3.55	3.50	3.85	5.80	6.65	6.65	7.75
Milwaukee	3.387	4.337	5.372	3.737	4.787[17]	3.687	3.687	3.637	3.987	5.837	6.887	6.887	8.137
Cleveland	3.35	4.40	4.977	3.60	4.45[17]	3.40	3.588	3.35	3.85	5.806	6.856	6.65	7.75
Buffalo	3.35	4.40	4.85	3.819	4.669	3.63	3.40	3.35	3.85	5.60	6.65	6.65	7.75
Detroit	3.45	4.50	5.10	3.70	4.659[17]	3.609	3.661	3.45	3.90	5.93	6.98	6.959	8.059
Cincinnati	3.425	4.475	4.925[5]	3.675	4.711	3.661	3.691	3.611	4.111	5.95	7.00	7.011	8.261
St Louis	3.397	4.347	5.231	3.747	4.931[17]	3.697	3.697	3.647	4.131	5.981	7.031	7.031	8.131
Pittsburgh	3.35	4.40	4.85	3.60	4.45	3.40	3.40	3.35	3.85	5.60	6.65	6.65	7.75
St. Paul	3.50	4.46	5.357	3.86	5.102[17]	3.813	3.813	3.763	3.461	5.94	5.99	7.361	8.461
Omaha	3.865	5.443	5.615	4.143	....	4.093	4.093	4.043	4.543	....	....	....	....
Indianapolis	3.52	4.568	5.018	3.768	4.741	3.63	3.63	3.58	4.08	5.93	6.98	6.98	8.23
Birmingham	3.45	....	4.85	3.70	....	3.55	3.55	3.50	4.53	....	....	....	....
Memphis	3.965	4.78	5.365	4.215	....	4.065	4.065	4.015	4.33	....	....	....	....
New Orleans	4.058*	5.079	5.458	4.308	....	4.158	4.158*	4.108*	4.729	....	....	....	....
Houston	3.763	5.573	6.413[1]	4.313	....	4.25	4.25	3.75	6.473[3]	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20	6.20	4.95	5.813[15]	4.95	4.65	4.40	5.683	8.204	9.404	9.304	10.454
San Francisco	4.55[14]	7.30[4]	6.45	4.50[14]	7.333[17]	4.65[14]	4.35[14]	4.15[14]	5.433	8.304	9.404	9.404	10.454
Seattle	4.65[12]	7.05[4]	6.05	4.25[12]	....	4.75[12]	4.45[12]	4.35[12]	5.783	....	9.404	....	....
Portland	4.65[11]	6.60[4]	5.85	4.75[11]	....	4.75[11]	4.45[11]	4.45[11]	5.633	8.304	9.404	8.304	9.404
Salt Lake City	4.530[17]	....	* 6.27[13]	5.53[17]	....	4.98[17]	4.98[17]	4.88[17]	6.00	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-FINISHED: Sheets, 400 to 1499 lb; strip, extras on all quantities; bars, 1500 lb base.

GALVANIZED: 450 to 1499 lb.

NE ALLOY BARS: 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb and over. (15) 1000 lb and over. (16) 1500 lb and over. (17) 2000 lb and over. (18) 3500 lb and over.

([a]) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.271¢ for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Maximum per gross ton, established by OPA Oct. 22, 1945. Prices do not reflect 3 pct tax on freight.

BASING POINT PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	$26.25	$26.75	$27.25	$27.75	.....
Birdsboro	26.25	26.75	27.25	27.75	$31.25
Birmingham	20.75	22.13	.....	26.75	.....
Buffalo	24.75	25.75	26.25	26.75	31.25
Chicago	25.25	25.75	25.75	26.25	.....
Cleveland	25.25	25.75	25.75	26.25	.....
Detroit	25.25	25.75	25.75	26.25	.....
Duluth	25.75	26.25	26.25	26.75	.....
Erie	25.25	25.75	26.25	26.75	.....
Everett	26.25	26.75	27.25	27.75	.....
Granite City	25.25	25.75	25.75	26.25	.....
Hamilton	25.25	25.75	25.75	.....	.....
Neville Island	25.25	25.75	25.75	26.25	.....
Provo	23.25	23.75	.....	.....	.....
Sharpsville [1]	25.25	25.75	25.75	26.25	.....
Sparrows Point	26.25	26.75	.....	.....	.....
Steelton	26.25	.....	.....	.....	31.25
Swedeland	26.25	26.75	27.25	27.75	.....
Toledo	25.25	25.75	25.75	26.25	.....
Youngstown	25.25	25.75	25.75	26.25	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$ .50	$26.75	$27.25	$27.75	$28.25	.....
Boston	Birdsboro-Steelton	4.02	.....	.....	.....	.....	$35.27
Brooklyn	Bethlehem	2.59	28.75	29.25	29.75	30.25	.....
Brooklyn	Birdsboro	2.92	.....	.....	.....	.....	34.17
Canton	Clev, Ygstn, Sharpsvil.	1.39	26.64	27.14	27.14	27.64	.....
Canton	Buffalo	3.19	.....	.....	.....	.....	34.44
Cincinnati	Birmingham	4.06	24.81	26.19	.....	.....	.....
Cincinnati	Hamilton	1.11	.....	.....	26.86	.....	.....
Cincinnati	Buffalo	4.48	.....	.....	.....	.....	35.65
Jersey City	Bethlehem	1.53	27.78	28.28	28.78	29.28	.....
Jersey City	Birdsboro	1.94	.....	.....	.....	.....	33.19
Los Angeles	Provo	4.95	28.20	28.70	.....	.....	.....
Los Angeles	Buffalo	15.41	.....	.....	.....	.....	46.66
Mansfield	Cleveland & Toledo	1.94	27.19	27.69	27.69	28.19	.....
Mansfield	Buffalo	3.36	.....	.....	.....	.....	34.61
Philadelphia	Swedeland	.84	27.09	27.59	28.09	28.59	.....
Philadelphia	Birdsboro	1.24	.....	.....	.....	.....	32.49
San Francisco	Provo	4.95	28.20	28.70	.....	.....	.....
San Francisco	Buffalo	15.41	.....	.....	.....	.....	46.66
Seattle	Provo	4.95	28.20	28.70	.....	.....	.....
Seattle	Buffalo	15.41	.....	.....	.....	.....	46.66
St. Louis	Granite City	.58	25.75	26.25	26.25	26.75	.....
St. Louis	Buffalo	7.07	.....	.....	.....	.....	38.32

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace, by order L 39 to RPS 10, Apr. 11, 1945, retroactive to Mar. 7, 1945. Delivered to Chicago, $42.34. High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorous content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. Effective Mar. 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron and bessemer ferrosilicon up to and including 14.00 pct silicon covered by RPS 10 as amended Feb. 14, 1945. Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$31.25; f.o.b. Buffalo—$32.50. Add $1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Ferromanganese Briquets

Contract prices per pound of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66% contained Mn. Add 0.25¢ for spot sales.

	Eastern	Central	Western
Carload, bulk	6.05¢	6.30¢	6.60¢
Ton lots	6.65¢	7.55¢	8.55¢
Less ton lots	6.80¢	7.80¢	8.80¢

Manganese Metal

Contract basis lump size, per pound of metal, f.o.b. shipping point with freight allowed. Spot sales add 2¢ per lb.

96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30¢
L.c.l. lots	32¢

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	34¢
Ton lots	36¢
Less ton lots	38¢

Spiegeleisen

Maximum base contract prices per gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50
F.o.b. Pittsburgh, Chicago	40.00	

Low-Carbon Ferromanganese

Contract prices per pound of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, eastern zone. Add 0.25¢ for spot sales.

	Carloads, Ton		Less
0.06% C, 0.06% P, 90% Mn	23.00¢	23.40¢	23.65¢
0.10% max. C, 1% or 2% max. Si	23.00¢	23.40¢	23.65¢
0.15% max. C, 1% or 2% max. Si	22.00¢	22.40¢	22.65¢
0.30% max. C, 1% or 2% max. Si	21.00¢	21.40¢	21.65¢
0.50% max. C, 1% or 2% max. Si	20.00¢	20.40¢	20.65¢
0.75% max. C, 7.00% max. Si	16.00¢	16.40¢	16.65¢

Electric Ferrosilicon

OPA maximum base price cents per pound contained Si, lump size in carloads, f.o.b. shipping point with freight allowed.

	Eastern	Central	Western
50% Si	6.65¢	7.10¢	7.25¢
75% Si	8.05¢	8.20¢	8.75¢
80-90% Si	8.90¢	9.05¢	9.55¢
90-95% Si	11.05¢	11.20¢	11.65¢

Silvery Iron

Si 14.01 to 14.50%, $45.50 per G. T. f.o.b. Jackson, Ohio; $48.75 f.o.b. Keokuk, Iowa; $46.75 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%. Covered by MPR 405.

Silicon Metal

OPA maximum base price per pound of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb, packed. Add 0.25¢ for spot sales.

	Eastern	Central	Western
96% Si, 2% Fe	13.10¢	13.55¢	16.50¢
97% Si, 1% Fe	13.45¢	13.90¢	16.80¢

Ferrosilicon Briquets

OPA maximum base price per pound of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add 25¢ for spot sales.

	Eastern	Central	Western
Carload, bulk	3.35¢	3.50¢	3.65¢
2000 lb-carload	3.80¢	4.20¢	4.25¢

Silicomanganese

Contract basis lump size, per pound of metal, f.o.b. shipping point with freight allowed. Add 25¢ for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05¢
2000 lb to carload	6.70¢
Briquet, contract basis, carlots, bulk freight allowed, per lb	5.80¢
2000 lb to carload	6.30¢
Less ton lots	6.55¢

Ferrochrome

(65-72% *Cr*, 2% *max. Si*)

OPA maximum base contract prices per pound of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add 0.25¢ per lb contained Cr for spot sales.

	Eastern	Central	Western
0.06% C	23.00¢	23.40¢	24.00¢
0.10% C	22.50¢	22.90¢	23.50¢
0.15% C	22.00¢	22.40¢	23.00¢
0.20% C	21.50¢	21.90¢	22.50¢
0.50% C	21.00¢	21.40¢	22.00¢
1.00% C	20.50¢	20.90¢	21.50¢
2.00% C	19.50¢	19.90¢	21.00¢
66-71% Cr, 4-10% C	13.00¢	13.40¢	14.00¢
62-66% Cr, 5-7% C	13.50¢	13.90¢	14.50¢

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

Ferrochrome Briquets

Contract prices per pound of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60% contained chromium. Add 0.25¢ for spot sales.

	Eastern	Central	Western
Carload, bulk	8.25¢	8.55¢	8.95¢
Ton lots	8.75¢	9.25¢	10.75¢
Less ton lots	9.00¢	9.50¢	11.00¢

Calcium—Manganese—Silicon

Contract prices per pound of alloy, lump size, f.o.b. shipping point, freight allowed to destination.

16-20% Ca, 14-18% Mn, 53-59% Si. Add 0.25¢ for spot sales.

	Eastern	Central	Western
Carloads	15.50¢	16.00¢	18.05¢
Ton lots	16.50¢	17.35¢	19.10¢
Less ton lots	17.00¢	17.35¢	19.60¢

Calcium Metal

Eastern zone contract prices per pound of metal, f.o.b. shipping point, freight allowed to destination. Add 5¢ for spot sales. Add 0.9¢ for central zone; 0.49¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.80	$2.30	$5.00
Less ton lots	2.30	2.80	5.75

Chromium—Copper

Contract price per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2¢ for spot sales.

Shot or ingot	45¢

Ferroboron

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed to destination. Add 5¢ for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% Max. C.

	Eastern	Central	Western
Ton lots	$1.20	$1.2075	$1.229
Less ton lots	1.30	1.3075	1.329

Manganese—Boron

Contract prices per pound of alloy, f.o.b. shipping point, freight charges allowed. Add 5¢ for spot sales.

75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

	Eastern	Central	Western
Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron

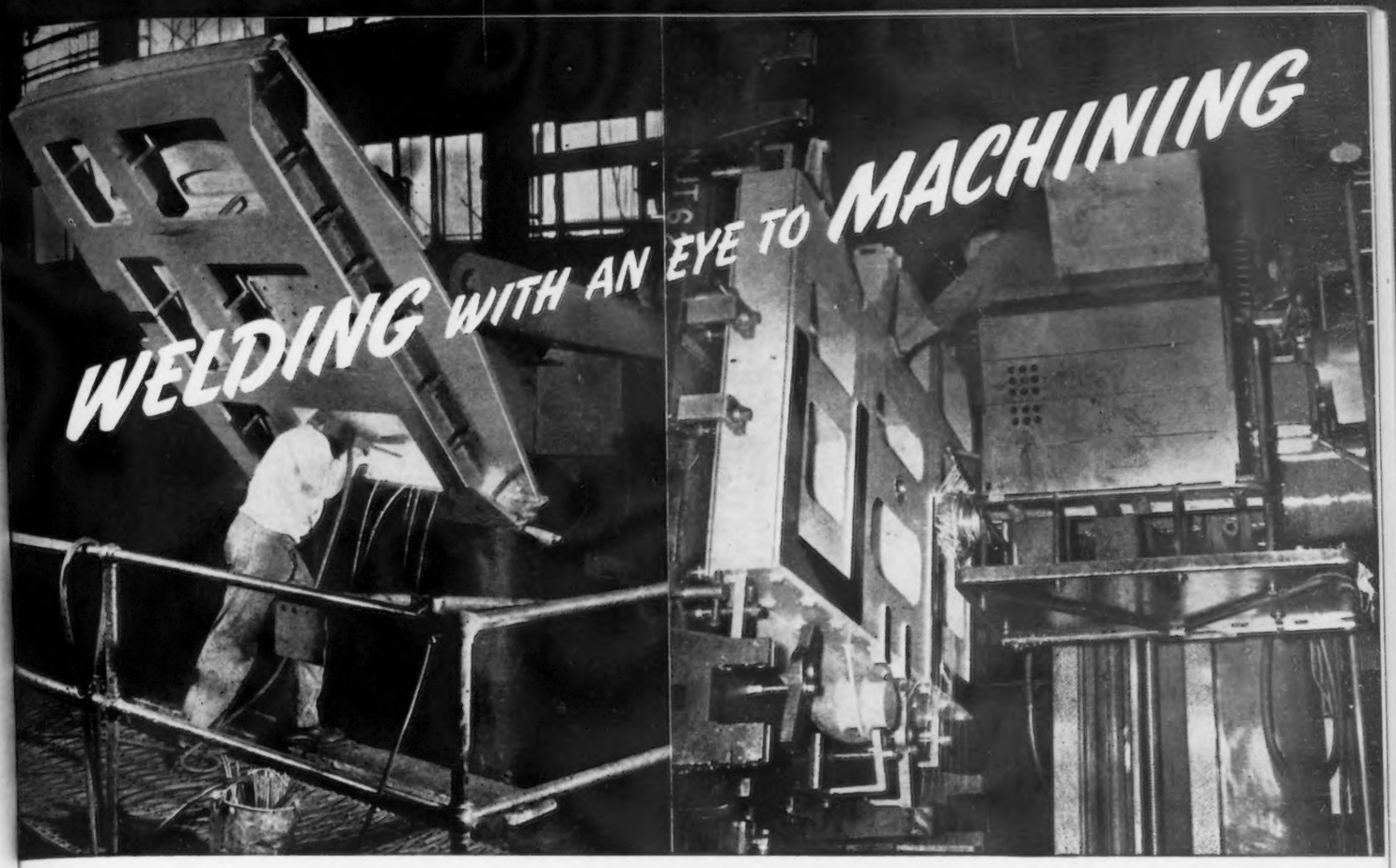
Spot and contract prices per pound of alloy, f.o.b. shipping point, freight allowed to destination.

15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

	Eastern	Central	Western
11,200 lb or more	$1.90	$1.9125	$1.9445
Ton lots	2.00	2.09125	2.0445
Less ton lots	2.10	2.1125	2.1445

Other Ferroalloys

Ferrotungsten, standard grade lump or ¼X down, packed f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per pound contained tungsten, 10,000 lb or more	$1.90
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, usual freight allowances, per pound contained V.	
Openhearth	$2.70
Crucible	$2.80
Primos	$2.90
Cobalt, 97% min., keg packed, contract basis, f.o.b. producers plant, usual freight allowances, per pound of cobalt metal	$1.50
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, any quantity, per pound contained V_2O_5. Spot sales add 5¢ per lb contained V_2O_5	$1.10
Silcaz No. 3, contract basis, f.o.b. plant with usual freight allowances, per pound of alloy.	
carload lots	25¢
2000 lb to carload	26¢
Silvaz No. 3, contract basis, f.o.b. plant with freight allowances, per pound of alloy.	
carload lots	58¢
2000 lb to carload	59¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb and over, max. based on rate to St. Louis	
No. 1	87.5¢
No. 6	60¢
No. 79	45¢
Bortram, f.o.b. Niagara Falls	
Ton lots, per lb	45¢
Less ton lots, per lb	50¢
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per pound contained Cb.	
2000-lb lots	$2.25
Under 2000-lb lots	$2.30
Ferrotitanium, 40-45%, 0.10% C. max. f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10% C. max., ton lots, per pound contained titanium	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15-20%, 6-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y. freight allowed east of Mississippi, north of Baltimore and St. Louis, per carload	$142.50
Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, Electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per pound contained Mo	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per pound of alloy. Add ¼¢ for spot sales	
Carload lots	14¢
Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per pound of alloy	
Carload, bulk	4.60¢
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk	5.75¢
Ton lots	7.25¢
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per pound.	
Car lots	8.00¢
Ton lots	8.75¢
Less ton lots	9.25¢



Mass Production of Machined Weldments

at Lower Final Cost

Position welding sped the above base to the machining stage because position welding is down-hand welding—faster because push button control brings the weldment to any desired angle—lessens handling and propping.

Revolving horizontal and vertical tables—standard and right-angle heads on the horizontal boring mill above makes possible innumerable combinations of milling, facing, turning, and boring, and multi-surface machining without change of setup. These extensive facilities at the Danly plant plus the "know how" are speeding reconversion with mass production of large units.

Three factors vital in cutting costs of manufacture of large structures are grouped here:

1 ***Known quality of welding.*** Flaw-free welding to close tolerances makes for effective reductions in the cost of machining. Rough cuts are fewer or may be eliminated entirely.

2 ***The job should be of volume quantity.*** Repetition makes for greater efficiency, and tooling costs lower as they are spread over volume production.

3 ***Facilities must be adequate to handle the job.*** In Danly's modern plant are the welding facilities, machine tools, normalizing furnaces, shot blast equipment, handling equipment, X-ray, Magnaflux, and complete inspection facilities for producing and delivering your job to any desired specifications at lower *final cost.*

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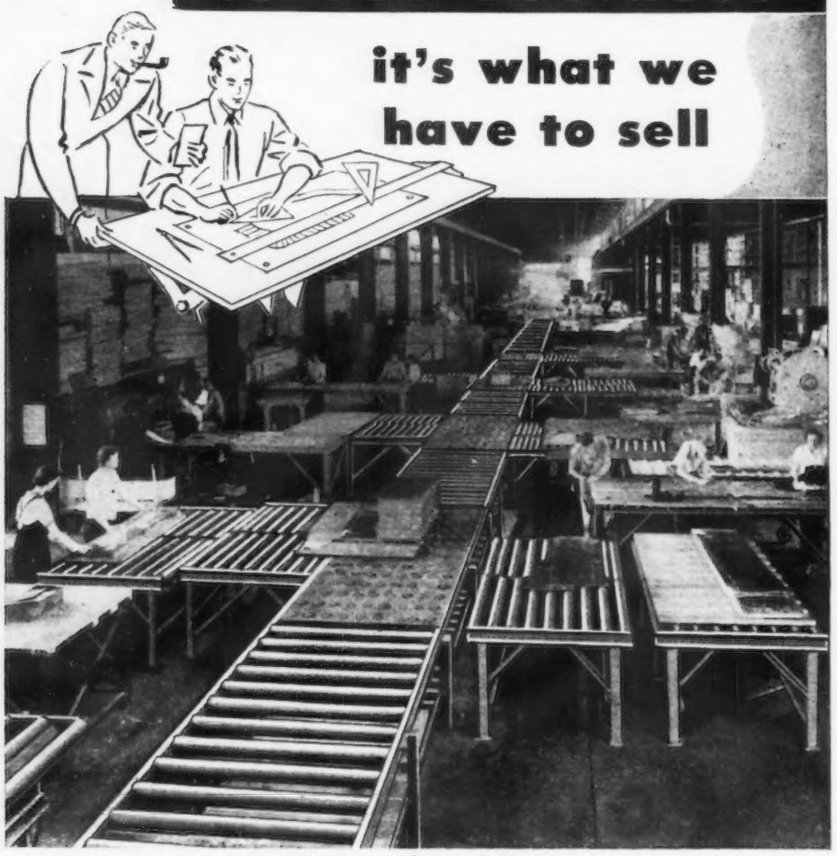

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In the above Logan conveyor installation, ball plate tables facilitate transfer of work in process from feeder line operations to main assembly line.

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PUT *FLOW* INTO PRODUCTION

Foundry Employment Expected to Grow In Next Several Years

Washington

• • • **Employment in foundries** during the next two years will average about 50 pct above the 1939 level and will approach that of the peak war year, according to a study made public recently by the Bureau of Labor Statistics, U. S. Department of Labor. In the longer-run period, after the accumulated demand for civilian durable goods has been met, increasing man-hour output will lead to a gradual and moderate decline in foundry employment, which will remain high.

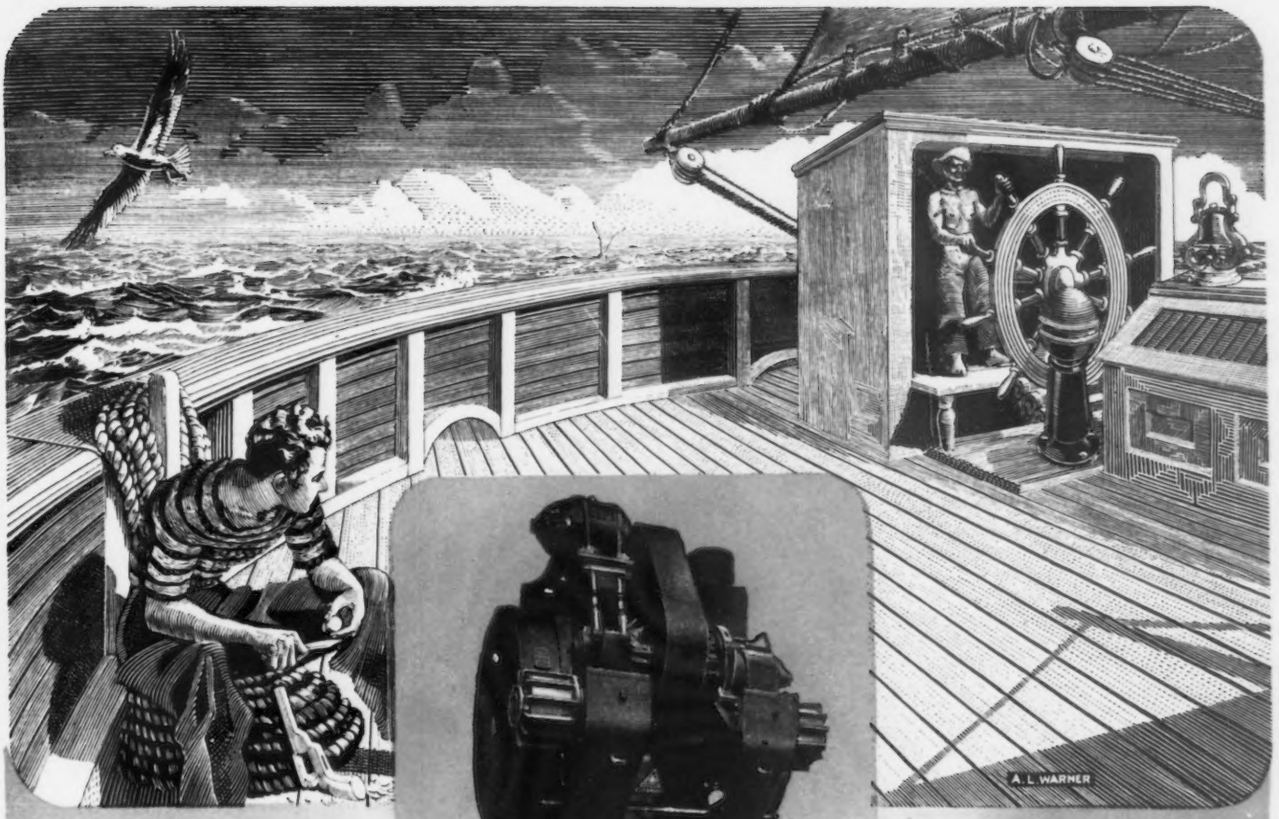
In the immediate postwar years, heavy demands for certain types of castings will hold foundry employment at high levels. Although the extensive mechanization of foundry operations during the war will tend to decrease peacetime employment slightly, this will be more than offset by the probable return to a 40-hr workweek, in place of the longer wartime schedule.

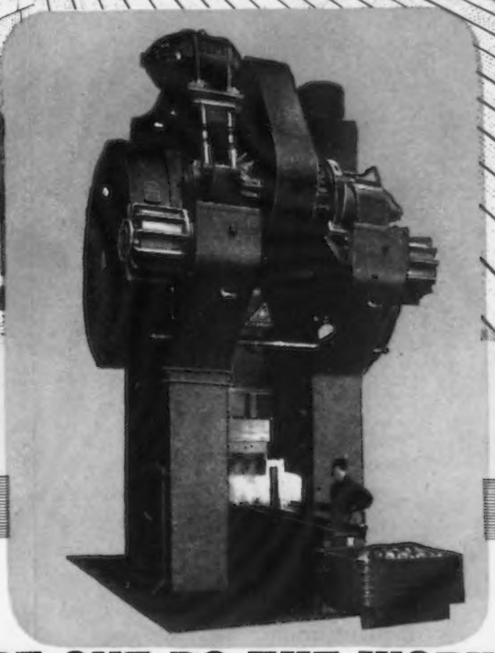
In the next two years, the employment of production workers in all classes of foundries is expected to average between 365,000 and 400,000, representing an increase of at least 110,000 over the estimated 255,000 employed in 1939. This future volume of employment will be below the 1944 peak of approximately 425,000 workers, but compares favorably with the level of about 375,000 for July 1945, when the first big cutbacks in war production had already been felt.

However, the anticipated increase over prewar employment is unequally distributed among the various major classes.

Employment in gray iron foundries during the war was only slightly above the depressed 1939 level, because of restrictions on many industries normally consuming large quantities of gray iron castings. These industries —such as automobile, construction, and household appliances— have extremely favorable prospects for the next few years. As a result, employment in gray iron casting should be very substantially increased.

Expanded employment in malleable iron foundries is also in-





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In 1835 Samuel Colt finally solved the problem that had puzzled gunsmiths for decades. Colt's contribution was a practical mechanism for accurately turning and indexing a revolver's six chamber cylinder. This he conceived as a Clipper ship sailor, after watching the operation of the ship's steering wheel ratchet.

By improvement and practical change of a conventional design, Colt thus replaced the older single shot pistol with the far more efficient six shot revolver.

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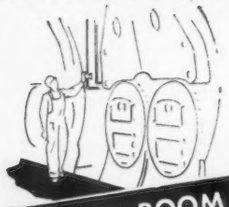
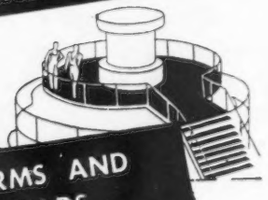


BOILER ROOM FLOORS...

RAMPS...

FOUNDRY FLOORS...



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The safety tread stays safe throughout long, hard service, yet can be quickly and easily cleaned, drains promptly, allows vehicles to roll freely.

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UNITED STATES STEEL

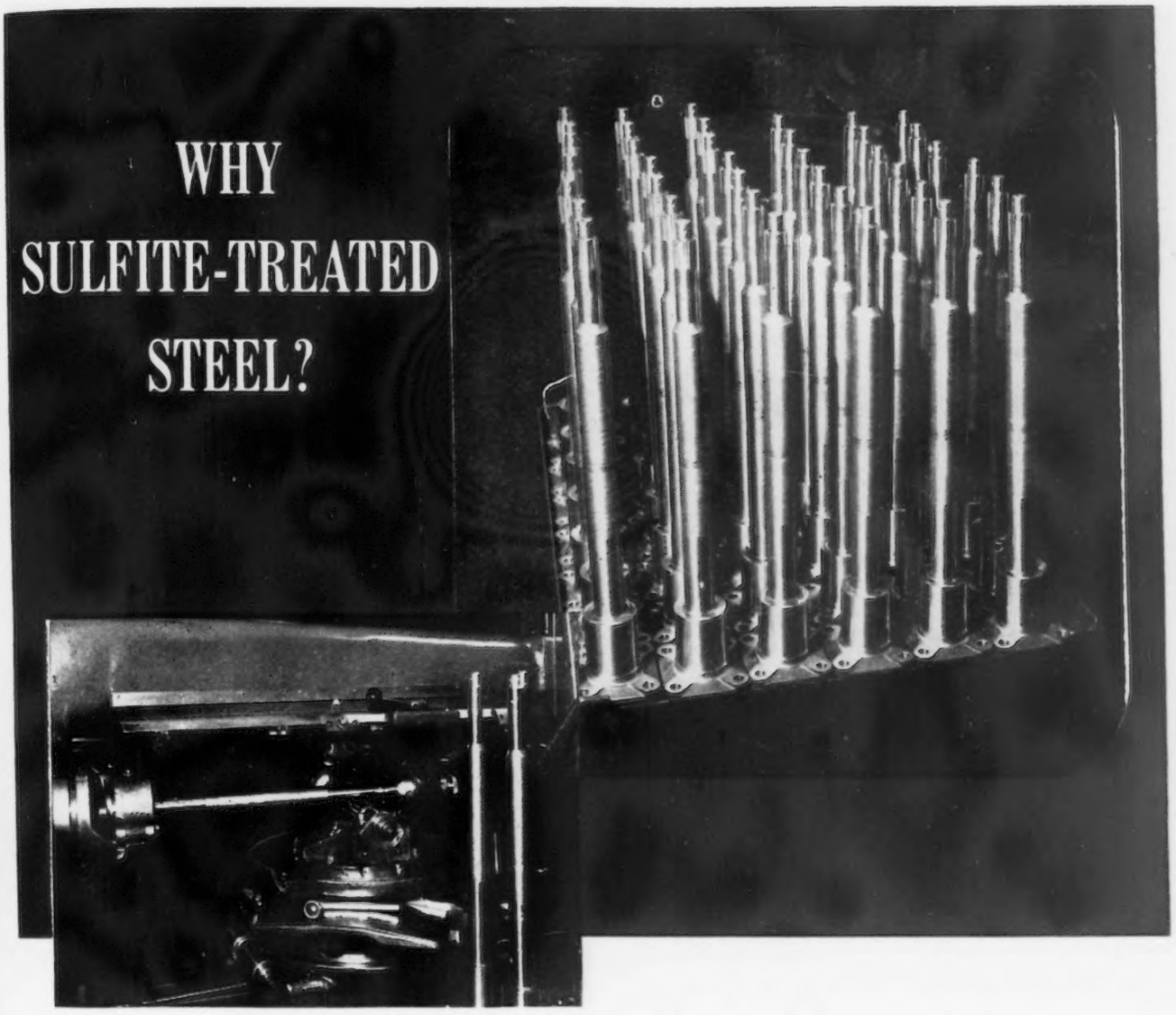
dicated. Although the demands of the military truck and combat vehicle programs raised malleable iron employment well above the 1939 level, high postwar output of automobiles and other peacetime products requiring malleable iron castings will lead to further increases in employment.

Employment in steel foundries is expected to remain considerably below the wartime peak, although far in excess of prewar employment. Great expansion in steel casting employment resulted from the requirements of shipbuilding and ordnance manufacture. However, by July 1945, cutbacks in these programs had reduced steel foundry employment to a level only slightly above that anticipated for the 1946-1947 period. The favorable outlook for the railroad-equipment and construction industries—important users of steel castings—should maintain this relatively high volume of employment.

For nonferrous foundries, a sharp postwar reduction in employment is indicated, mainly as a result of the curtailment of much of the aircraft and shipbuilding demands which had greatly expanded nonferrous casting during the war. Nevertheless, the anticipated level of employment far exceeds that of 1939, inasmuch as activity in the industries consuming nonferrous castings—including railroad equipment, shipbuilding, aircraft, and industrial machinery—should be well above the prewar rate.

In the longer run period, after the accumulated demands for certain durable goods have been met, employment in gray iron and malleable iron foundries, greatly increased in the immediate postwar years, will probably be reduced. Employment in steel casting, having dropped sharply in 1945, should remain fairly stable. Employment in nonferrous casting, after the initial postwar drop will probably show a gradual and moderate rise as new uses of the light metals are developed.

Technological developments, in the long run, will significantly affect the number of foundry jobs. These technological trends include greater use of materials-handling equipment, improved molding and coremaking machines, permanent molds, and centrifugal casting. The result will be a slow, steady increase



Just Look at the Record

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These shafts are made from Wisconsin Sulfite-Treated Steel and just look at the production record. Using Sulfite-Treated Steel, the average pieces per grind on a continuous-turn tool increased from 9 to 35—a 290% increase in tool life! An intermittent-cut tool showed an increase from 7 pieces per grind to 43—a 515% increase! Three other operations showed increases of from 100% to 120%. Remember, these operations are on steel heat-treated to a mean hardness of 300 Brinell.

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in castings output per manhour which will lead to some reduction in foundry employment. However, this decline will diminish the number of openings for new workers rather than decrease jobs available to those who establish themselves in the industry.

Trends in foundry employment as a whole do not take account of all supply and demand factors affecting the job opportunities in particular occupations. For this reason, the outlook for specific foundry occupations — including molders, coremakers and patternmakers—is discussed in the second part of this study, soon to be released. Training, earnings and working conditions will also be covered. Both parts of the study will be published together in bulletin form.

Notes Drop in Number Of Building Permits Issued in November

Albany, N. Y.

• • • **The number of building permits issued and plans filed in 105 localities throughout New York State dropped from October to November. There were 6808 projects planned in November to cost an estimated $30,637,000 as compared with 7877 projects in October to cost $31,758,000. Seasonal factors were responsible for most of the decrease.**

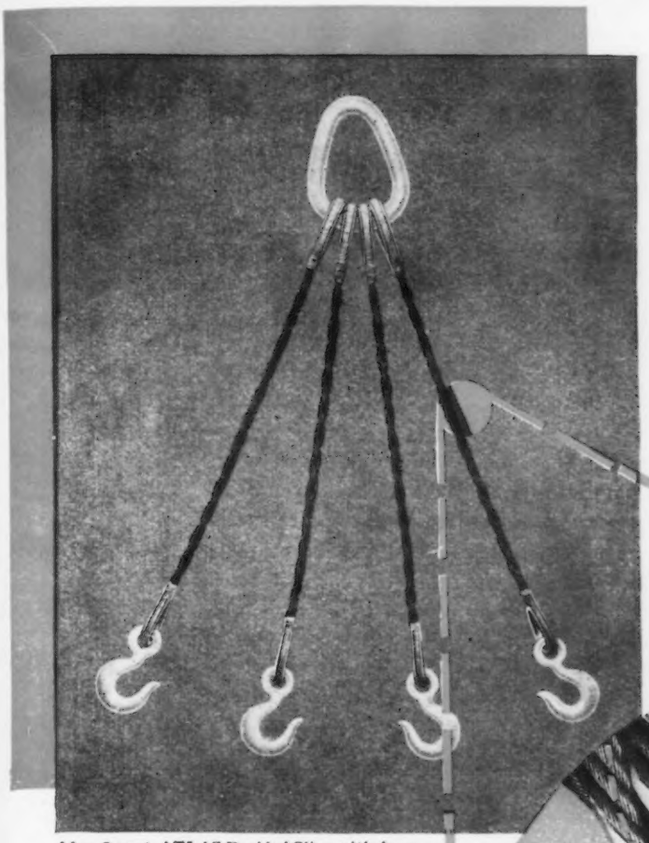
These figures were contained in a report to the Industrial Commissioner from the State Labor Depts'. Div. of Research and Statistics.

In the five boroughs of New York City more new buildings were planned but plans filed for alterations and installations dropped sharply. The total number of plans filed in November was 4442 as compared with 4778 in October. Proposed expenditures for construction were estimated at $22,968,000 in November as compared with $20,891,000 in October.

The largest planned expenditure in November, $6,238,000, was for construction of factories in Manhattan and Brooklyn and public utilities in Richmond.

There were 608 residential building plans filed to cost $6,077,000 providing 895 dwelling units. Thirteen public buildings were planned at a total cost of

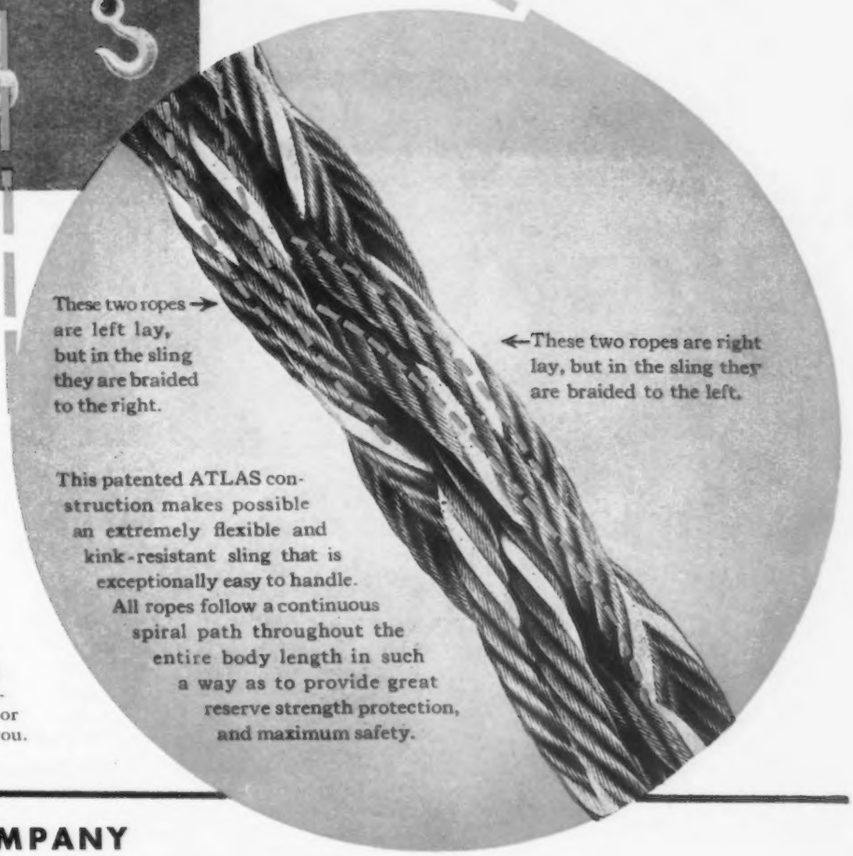
(CONTINUED ON PAGE 148)



4-leg, 8-part, ATLAS Braided Sling with drop-forged hooks—just one of many sizes, types and assemblies custom-made for your safety.

Don't take chances with safety! Always specify

MACWHYTE *Atlas* *Braided* WIRE ROPE SLINGS!


These two ropes → are left lay, but in the sling they are braided to the right.
←These two ropes are right lay, but in the sling they are braided to the left.
This patented ATLAS construction makes possible an extremely flexible and kink-resistant sling that is exceptionally easy to handle. All ropes follow a continuous spiral path throughout the entire body length in such a way as to provide great reserve strength protection, and maximum safety.

Rigging up loads for connection to crane hooks is a hazardous business. Only slings with adequate safety factors are good enough for safe handling in your plant. For your safety, breaking strengths and safe loads at various angles of use are listed for each size of Macwhyte ATLAS Sling, and published in Macwhyte Sling Catalog S-7.

Send for Sling Information!

Ask for your copy of Macwhyte Sling Catalog S-7 and book of photographs "Safe Slings in Industry" 44-1. Mail request on your Company letterhead to Macwhyte Company or any of our distributors or mill depots near you.

MACWHYTE COMPANY

2911 Fourteenth Avenue, Kenosha, Wisconsin

Manufacturers of the CORRECT wire rope for your equipment

Left & Right-Lay Braided Slings · Aircraft Tie-Rods
Aircraft Cable · "Safe-Lock" Swaged Terminals

Mill Depots: New York · Pittsburgh · Chicago · Ft. Worth · Portland Seattle · San Francisco · Distributors throughout the U.S.A.

UNIVERSAL SAFETY

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NO 44-S

RIGHT-LAY **MACWHYTE SLINGS FOR INDUSTRY** LEFT-LAY

"Lifting safety to new heights"

Macwhyte Wire Rope Slings are made to meet the capacity of any crane built

Announcing the

KEARNEY & TRECKER
MILWAUKEE
Model TT Precision Milling and Boring Machine

Scientifically constructed for accurate and convenient operation, the Model TT Precision Milling and Boring Machine enables the operator to mill and bore a workpiece from two sides without changing the setup —an answer to your difficult milling and boring problems that require exceptional precision. Convenient operation is of paramount importance on any machine tool. This machine provides dual table controls on each side of the bed. Each upright is a complete unit in itself with column and spindle controls. A swiveling control pendant provides complete control from the most advantageous operating position at each column.

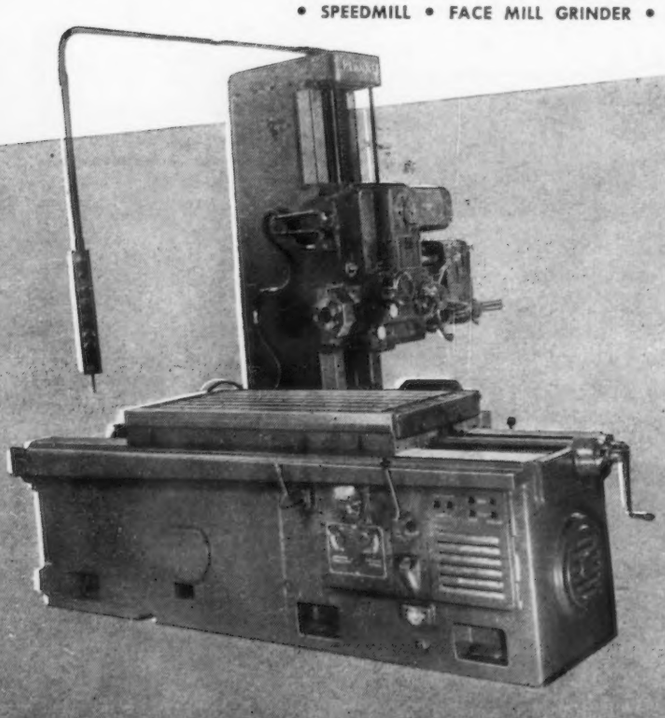
Features of operation and construction that make this machine outstanding in precision operation and versatility are —

- The No. 50 National Standard spindle nose to accommodate modern milling tools.
- Spindle rotation of both spindles in either direction permit the use of right or left hand milling cutters.
- A wide range of speeds and feeds are available for the efficient use of modern cutting tools on a wide variety of operations.
- A thread cutting feature provides boring and thread cutting on two sides of a workpiece in a single setup.

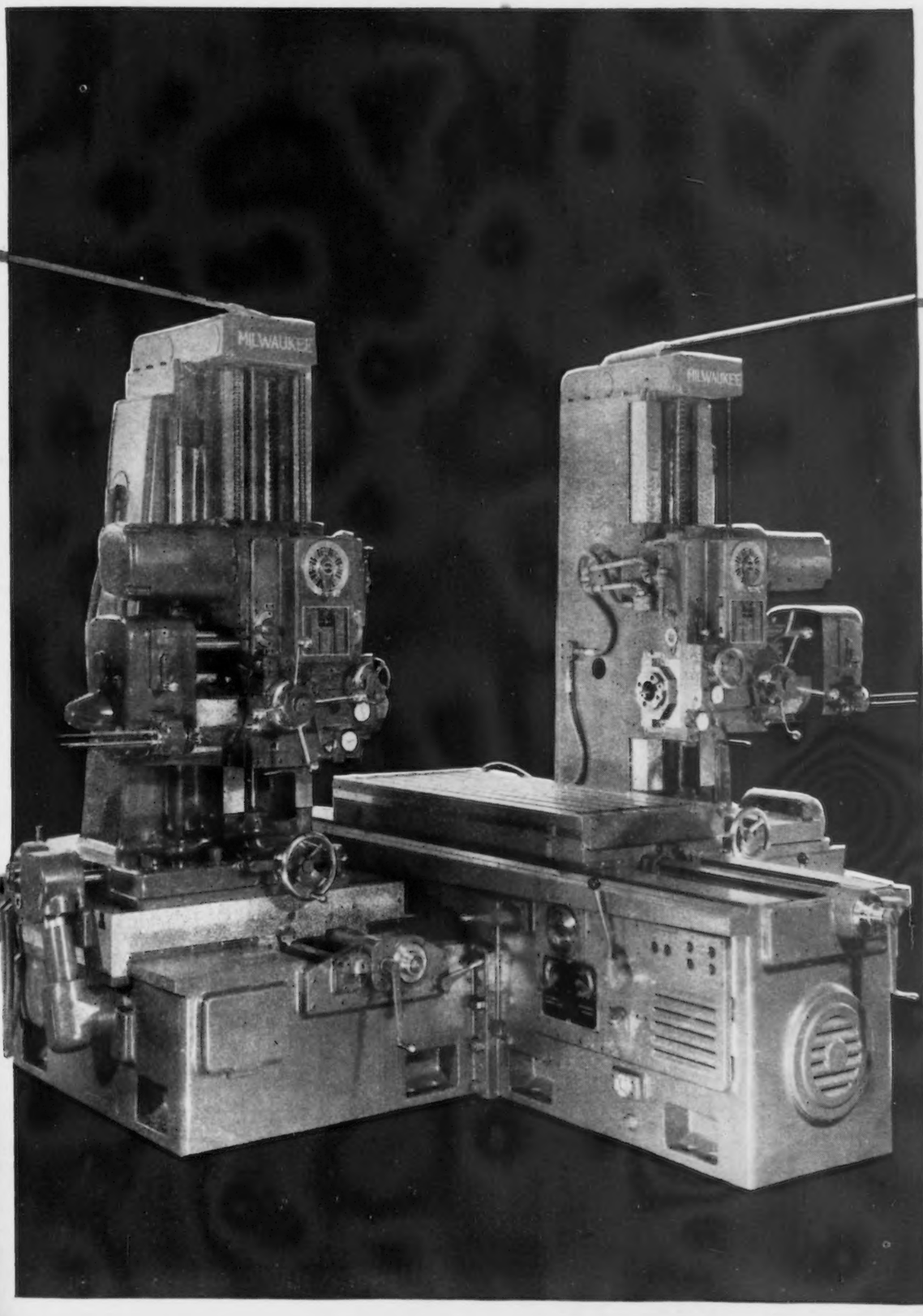
Write for Catalog T11, a complete descriptive catalog on the Model T and the Model TT Precision Milling and Boring Machine.

KEARNEY & TRECKER
Products
CORPORATION
MILWAUKEE 14, WISCONSIN
Subsidiary of Kearney & Trecker Corporation

BUILDERS OF MILWAUKEE ROTARY HEAD MILLING MACHINE • MIDGETMILL • SPEEDMILL • FACE MILL GRINDER • AUTOMETRIC BORING MACHINES.



The Model T Precision Milling and Boring Machine, a single spindle machine, is the companion to the Model TT. It is an ideal machine for precision work in the toolroom where great accuracy is required.



KEARNEY & TRECKER
MILWAUKEE
Precision Milling and Boring Machine
No. 3 MODEL TT

ARMSTRONG
The Armstrong System makes it easy to tool up efficiently
There is a right way to tool up every job—a correct tool of proper size, shape, cutting angle and strength . . . a type of cutter that will be most efficient for the material to be machined, the cutting speed and machining conditions. Comprising (1st) ARMSTRONG TOOL HOLDERS of over 250 sizes and shapes, (2nd) ARMSTRONG HIGH SPEED Bits, Blades and Cutters, (3rd) ARMALOY Cast Alloy Bits and Blades, and (4th) ARMIDE Carbide-tipped Cutters in both "Red" and "Grey" grades, the Armstrong System reduces the problem of correctly tooling-up for any operation on lathes, planers, slotters or shapers, to the selection of the correct ARMSTRONG TOOL HOLDER and the best suited cutter-bit. In the Armstrong System your tool designing has already been expertly done for you, the new cutting materials and advanced machining methods adopted, the tests made, the "bugs" eliminated, and all engineering costs absorbed. You can buy efficient up-to-the-minute tooling "over the counter" from your local industrial distributor. To tool up this easy way is to tool up the right way. Plan your reconversion or post-war tooling around the Armstrong System of Tool Holders.
ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
309 N. Francisco Ave. Chicago 12, Ill.
Eastern Whse. and Sales Office:
199 Lafayette St.
New York 12, N. Y.
Pacific Coast Whse. and Sales Office:
1275 Mission St.
San Francisco 3, Calif.
Buy ARMSTRONG TOOLS from your Supply House
ARMSTRONG TOOL HOLDERS Are Used in Over 96% of the Machine Shops and Tool Rooms

(CONTINUED FROM PAGE 144)

$4,203,000. Proposed expenditures for miscellaneous buildings including garages, service stations, etc. were twice as large as in October; $1,095,000 as compared with $531,000 although fewer plans were filed.

Plans filed for alterations and installations dropped both in number and estimated costs. There were 3599 plans filed in November to cost $5,355,000 as compared with 4012 in October to cost $7,707,000.

Permits issued outside New York City showed a seasonal slump with 733 fewer permits issued in November than October and a drop of $3,198,000 in planned expenditures. Fewer permits were issued for industrial and commercial, and public buildings. More money was to be spent in constructing miscellaneous types of buildings but fewer permits were issued.

Permits were issued for 1688 additions, alterations and repairs, a drop of 670 from October although proposed expenditures rose from $2,070,000 to $2,262,000.

Sixty-seven permits were issued for industrial and commercial buildings in November to cost $2,428,000.

Riddle Retires After 53 Yr with Isabella Blast Furnace Plant

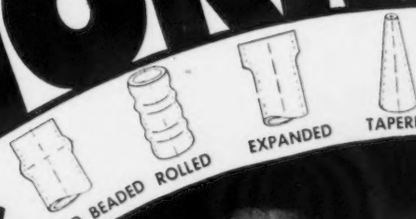
Pittsburgh

• • • **Lawrence E. Riddle,** general superintendent of Isabella Furnaces, blast furnace operation of Carnegie-Illinois Steel Corp. at Etna, Pa., has retired after 53 years continuous service with this U. S. Steel subsidiary.

At the same time, it was announced that the management of Isabella Furnaces will be combined with the Clairton Steel Works under H. W. Seyler as general superintendent of combined operations. Isabella Furnaces will now be identified as Isabella Furnaces of Clairton Steel Works.

Mr. Riddle, known as the dean of blast furnace men, began his career as an apprentice chemist at Isabella in 1892. He was made general superintendent in 1914, and in 1926 was given the added responsibility of superintending the blast furnace and sintering plants of the company's Duquesne

WORKABILITY



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Michigan

Welded Steel Tubing

SIZES 1/4" to 4" O.D.

GAUGES 9 to 22

ROUND • SQUARE • RECTANGULAR
and SPECIAL SHAPES

Michigan welded steel tube can be flanged, expanded, cold drawn, fluted, flattened, bent, coiled, upset, beaded, grooved, rolled, spun, threaded, tapered, and shaped to meet every manufacturing demand. •Available in commercial mill lengths or cut to specified lengths, shaped and fabricated, ready for assembly.

Engineering advice and technical help in the selection of tubing best suited to meet your needs.

Michigan **STEEL TUBE PRODUCTS COMPANY**

MORE THAN 25 YEARS IN THE BUSINESS

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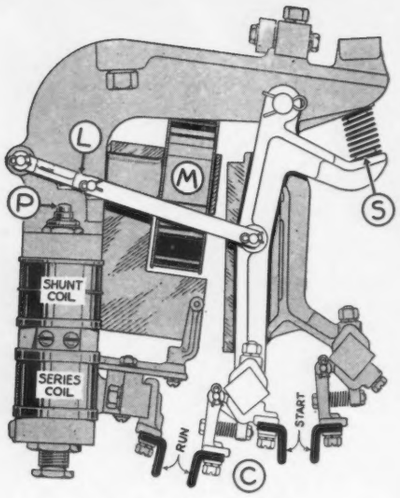
FACTORIES: DETROIT, MICHIGAN and SHELBY, OHIO

DISTRIBUTORS: Steel Sales Corp., Detroit, Chicago, St. Louis, Milwaukee and Minneapolis — Miller Steel Co., Inc., Hillside, N. J. — C. L. Hyland, Dayton, Ohio—Dirks & Company, Portland, Oregon—James J. Shannon, Milton, Mass.—Service Steel Co., Los Angeles, Calif.—American Tubular & Steel Products Co., Pittsburgh, Pa.—Strong, Carlisle & Hammond Co., Cleveland, Ohio—C. A. Russell, Inc., Houston, Texas—Drummond, McCall & Co., Ltd., Toronto, Canada.

HEAVY DUTY, PUSH BUTTON STARTERS FOR A-C MOTORS



Standard (Semi-Dust-tight) Enclosure➡

For reduced voltage starting of 220-550 volt squirrel-cage motors these EC&M auto-transformer starters have a reputation for low up-keep cost throughout industry.

As illustrated above, the mechanism is a single, quick-break, double-throw Contactor (C), operated by a single Magnet (M), a throw-over Spring (S) and a mechanical Latch (L) tripped by plunger (P) which is raised by a current-limit relay to cause transition from reduced voltage starting to full voltage running.

Arranged for wall mounting with contactor oil-immersed in removable tank, the auto-transformers and thermal Overload Relays are mounted in the upper part of the case. Unlike conventional thermal relays, this device is of the hot-wire expansion type. It is set to trip at a low value of current above normal full load motor current for accurate overload protection. This can be done without false tripping during the starting period, because the wire is protected from high starting currents by current transformers.

Bulletin 1045-B gives complete ratings and dimensions and also lists three larger sizes of starters for 220-550 volt motors. Write for your copy.

←Type VIII Enclosure for Class 1, Group D Hazardous Locations

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79th STREET • CLEVELAND 4, OHIO

Works, holding both positions until his retirement.

An authority on the production of all types of special iron as well as ferromanganese and ferrosilicon products, Mr. Riddle has been responsible for many improvements in blast furnace construction, operation and control. He has seen the daily production of blast furnaces rise from a top of 200 tons to over 1400 tons a day in the largest new furnaces, with equivalent improvements in safety and ease of operation.

Mr. Riddle is the author of many articles on blast furnace practice. He is a co-founder of the Eastern States Blast Furnace & Coke Oven Assn. and is also a member of the American Iron & Steel Institute, the American Institute of Mining Engineers, and the Western Pennsylvania Engineers Society.

Channels Additional Items Into Housing Program to Aid Vets

Washington

• • • **CPA has issued** three more directions to PR 33 to channel bathtubs, cast iron radiation and cast iron soil pipe into the Reconversion Housing Program for veterans.

Starting Feb. 1, 1946, distributors and jobbers must set aside 60 pct of their inventories of bathtubs and cast iron soil pipe and 70 pct of cast iron radiation. This amount must be held for a period of 21 days for filling HH rated orders. Thereafter the distributor or jobber must continue to set aside from each shipment received the same percentage for HH rated orders and each such set-aside must be held for HH orders for the 21-day period, after which any of the materials remaining may be sold against other rated orders or against unrated orders in accordance with PR 1.

Under the directions, HH ratings are not extendible by jobbers or distributors to producers of the three materials. Civilian Production Administration officials pointed out, however, that any maldistribution of any or all of the three materials which would jeopardize the housing program would be followed by changes in the rating setup either by directives or by making the ratings

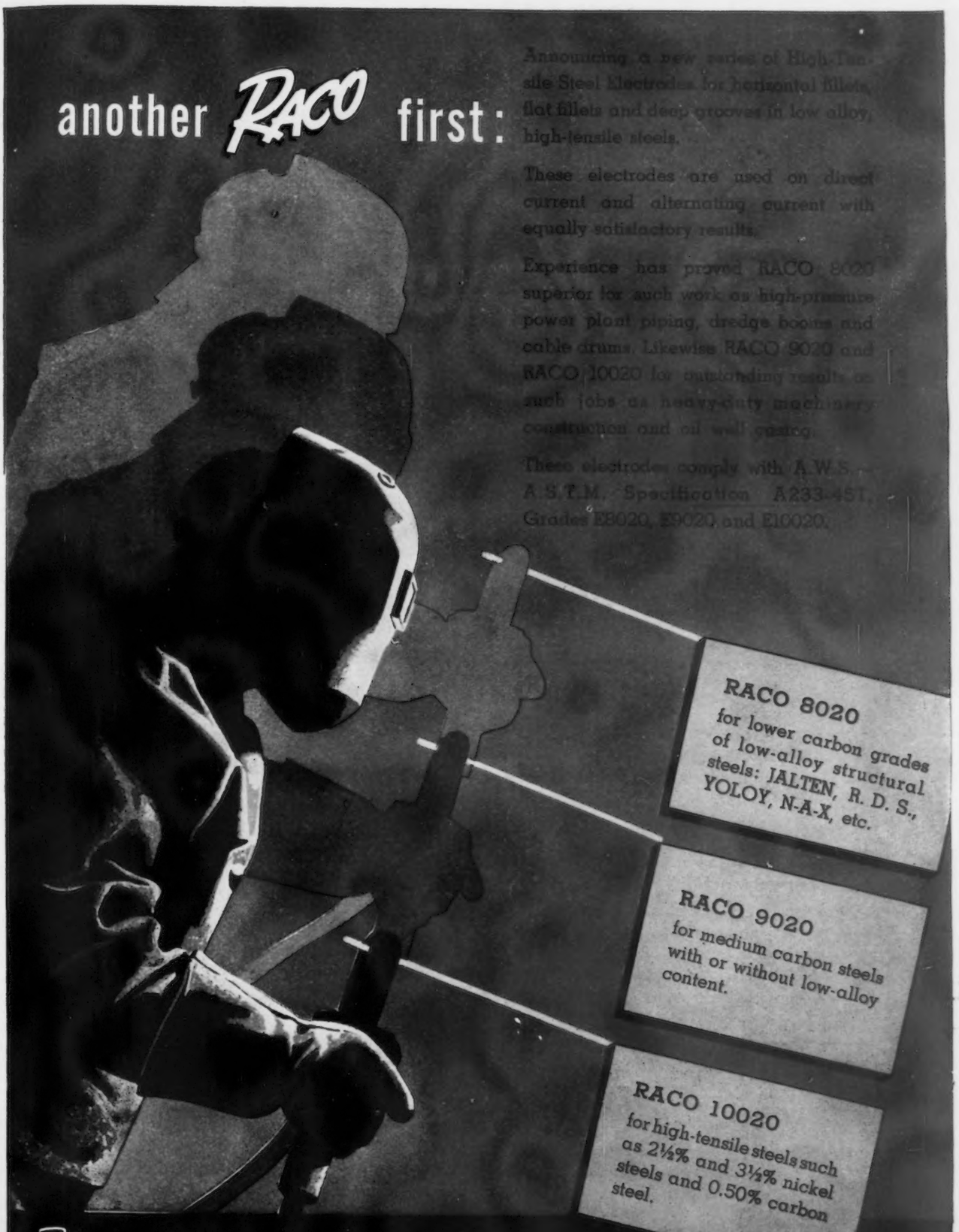
another RACO first:

Announcing a new series of High-Tensile Steel Electrodes for horizontal fillets, flat fillets and deep grooves in low alloy, high-tensile steels.

These electrodes are used on direct current and alternating current with equally satisfactory results.

Experience has proved RACO 8020 superior for such work as high-pressure power plant piping, dredge booms and cable drums. Likewise RACO 9020 and RACO 10020 for outstanding results on such jobs as heavy-duty machinery construction and oil well casing.

These electrodes comply with A.W.S.-A.S.T.M. Specification A233-45T, Grades E8020, E9020 and E10020.



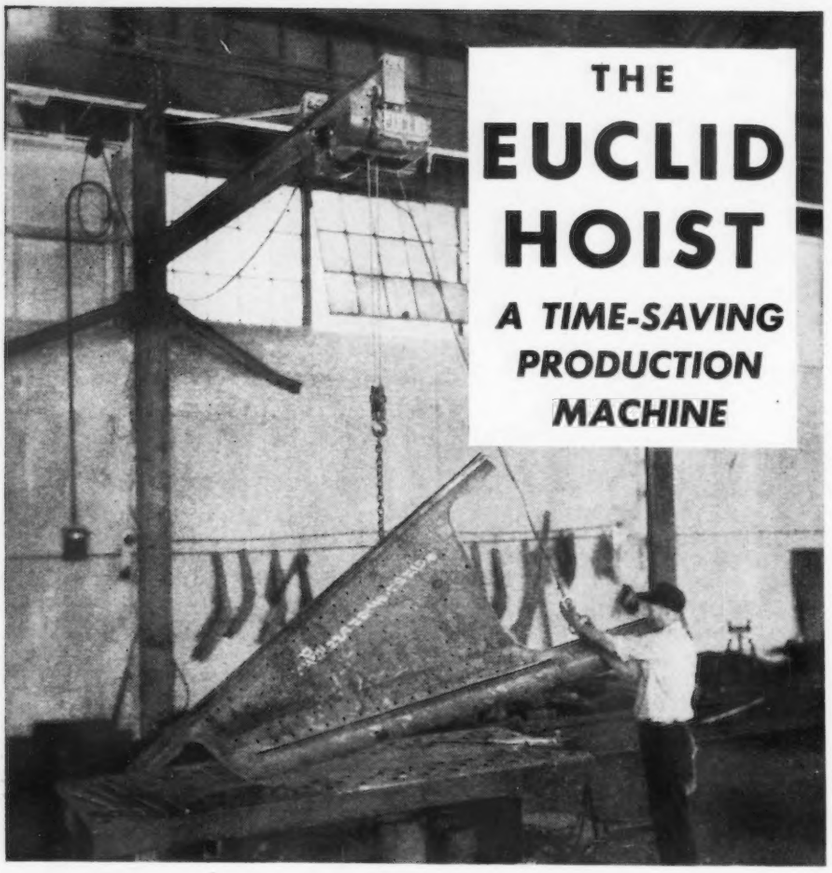
RACO 8020
for lower carbon grades of low-alloy structural steels: JALTEN, R. D. S., YOLOY, N-A-X, etc.

RACO 9020
for medium carbon steels with or without low-alloy content.

RACO 10020
for high-tensile steels such as 2½% and 3½% nickel steels and 0.50% carbon steel.

The REID-AVERY COMPANY
INCORPORATED
DUNDALK . BALTIMORE 22 MARYLAND

SINCE 1919 PRODUCERS OF ARC WELDING ELECTRODES AND WELDING RODS



★ In many plants this type of jib mounted Euclid Hoist swings over a wide radius to serve assembly bays while Euclid Cranes travel above in handling heavier loads over the entire shop area.

This is but one of a host of uses for Euclid Hoists where speed, smooth operation, safety and low cost maintenance are essential.

The push button control with flexible cable permits free movement of operator during raising and lowering of load.

The full line of Euclid Hoists in various types and in capacities from 1000 to 30,000 pounds, with controls as desired, is illustrated and described in Bulletin 838. Write for it.

THE EUCLID CRANE & HOIST COMPANY

1361 CHARDON RD.
EUCLID, OHIO

extendible to producers.

The directions also provide that a producer of any of the three materials covered may elect to accept orders from persons other than distributors, jobbers or manufacturers of prefabricated housing. In that event, however, starting Feb. 1, 1946, 60 pct of bathtubs and cast iron soil pipe and 70 pct of cast iron radiation which a producer may sell directly to other than jobbers, distributors or manufacturers of prefabricated housing must be sold on HH rated orders.

Meanwhile, the Dept. of Commerce has released the following estimated requirements for the three items:

Bathtubs (cast iron and steel)—Estimated 1946 requirements are 960,000 tubs, an increase of 78 pct over the current annual rate of 540,000 tubs. In 1937, when only cast iron tubs were made, output was 887,000 tubs. Capacity for steel tub production in 1946 is expected to be more than 200,000 tubs.

Cast Iron Radiation—Estimated 1946 requirements are 60,000,000 sq ft; current production is 16,000,000 sq ft, calling for an increase of 275 pct. In 1941 the output of 16 plants was 84,000,000 sq ft. At present, out of 15 plants, 10 are producing, 2 are on strike and 3 are shut down. With resumption of production in the 2 plants now out on strike the 12 plants will have capacity equal to 90 pct of prewar production.

Cast Iron Soil Pipe—Estimated 1946 requirements are 390,000 tons, an increase of 55 pct over the current rate of 251,000 tons. Capacity of plants now operating is about 550,000 tons.

Elects Batcheller to Board

New York

• • • **The election of** Hiland G. Batcheller, president of Allegheny Ludlum Steel Corp., to the board of trustees of Industrial Hygiene Foundation was announced Jan. 22, by Andrew Fletcher, board chairman. The announcement came following the annual meeting of the foundation's trustees held at the St. Joseph Lead Co., of which Mr. Fletcher is vice-president.

Mr. Batcheller has been president of Allegheny Ludlum Steel Corp. since 1938.

GUARANTEED
TO OUT-WEAR
OUT-LAST
ANY SHOVEL MADE
Unconditionally
With Blades of
SUPER-TOUGH . . .
LONGER WEARING
Mo-lyb-den-um
ALLOY
STEEL
Moly
REG. US PAT OFF
Moly Shovels, spades and scoops are made in all required types, styles, sizes and weights.
A Plus-Premium Quality Product of
THE WOOD SHOVEL AND TOOL CO.
PIQUA, OHIO
A national organization specializing exclusively in Shovels, Spades and Scoops
Moly
REG. U.S. PAT. OFF
MO-LYB-DEN-UM
ALLOY
SHOVELS

THREE ROADS LEAD TO VIBRATION CONTROL and KORFUND utilizes All Three

***YOU CAN'T** operate impact machinery without vibration,* **and uncontrolled vibration causes building damage, machine breakdowns, accidents, spoiled work and lowered employee efficiency.**

***YOU CAN** control vibration* **. . . Cork, Rubber, and Steel Spring vibration isolators have been designed to do the job.**

But the question is *which* one for *your* requirements?

And that is the question Korfund Vibration Control Engineers can answer. We do not believe that any *one* isolating material is a cure-all for vibration and noise. For over forty years Korfund has specified installation of *all three* types. Selection of the control best suited for your machinery depends upon the nature of the installation, type of equipment isolated, and your local operating conditions.

Ask for a Korfund Vibration Control Engineer to recommend the proper isolators for your equipment, *now*, during your reconversion period. We have representatives in principal cities. And in the meantime write for more information.

KORFUND
VIBRATION CONTROL
THE KORFUND COMPANY, Inc., 48-35 32nd PL., LONG ISLAND CITY 1, NEW YORK

RFC Fosters Program To Convert Aircraft Engines to New Uses

New York

• • • **Aircraft engines** are being converted to peacetime uses as power units for farms, industrial plants and motor boats under a development program being conducted by the Reconstruction Finance Corp. as part of its aircraft disposal activities.

Working with private industry under experimental engineering contracts, the RFC is seeking under this program to find new uses for surplus military aviation equipment that is unadaptable to civil flying and otherwise would have value only as scrap.

The Texas Industrial Co. of Houston, Tex., working under an RFC contract, has converted a radial diesel aircraft-type engine into a power plant capable of lighting a town of 3000 persons. Experimental results show that the engine, in a hookup with a standard alternating current generator, will develop a 75-kw charge load with an operating cost as low as 45¢ an hr.

The RFC has 1500 of the surplus diesels available in two groups, of 250 and 345 hp, and some of these are new. They originally were developed for use in aircraft, but later were converted to drive medium tanks. Previous sales tests by the RFC have indicated a very light demand for the engines as they are, and if their use as power plants fulfills promises, they may have continued utility where otherwise the majority would have value only as scrap.

In a second project, the Evans Products Co. of Detroit is developing power plants of 100, 200 and 300-kw capacity from standard type aircraft engines. In these experiments air-cooled radial engines are coupled directly with the generator, thereby making use of the cooling fan for both units.

The converted engine uses less than one third of its available power output and operates at materially reduced speeds. This makes it possible to use low priced nonaviation unleaded or low octane gasoline.

Market plans are being developed for the converted power units

(CONTINUED ON PAGE 156)

HOUGHTON'S BIG 6 FOR '46

New metal processing ideas ... production-proven

NEW HARDENING SALT
Inhibited to provide automatic rectification.

NEW HIGH SPEED STEEL SALT
Combined with carbon-rod rectifier which prolongs pot and electrode life, at low cost. Salt consumption reduced.

NEW "HOT" QUENCHING OIL
Usable up to 450° F., preventing distortion, yet enabling full hardness.

NEW ANTISEP SOLUBLE OIL
For cutting and grinding, combining antiseptic and remarkable cleansing powers . . . no reservoir residue, no rusting of work at high dilutions.

NEW DRAWING COMPOUNDS
Six aids to ease metal drawing, stamping or punching, protecting dies and work. A complete series from heavy pigmented compounds to light oil.

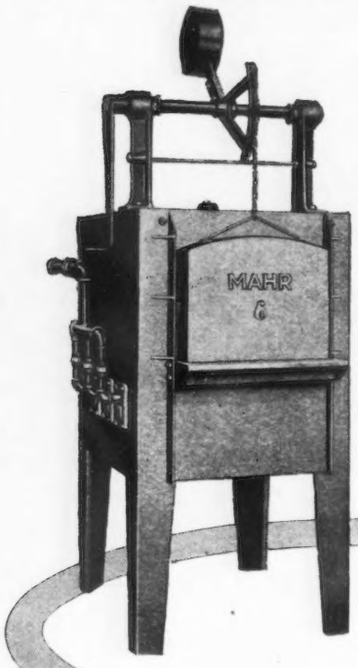
NEW RUST PREVENTIVES
Based on war experience; intended for the peace-time job of inhibiting against corrosion. Special attention given to fingerprint suppression.

These are headliners of the Houghton line for '46 . . . some born out of war, some developed since the ending of war shortages released critical materials. For heat treating and metal processing, depend on Houghton's 81-year background and expert technical aid. E. F. HOUGHTON & CO., Philadelphia and all principal cities.

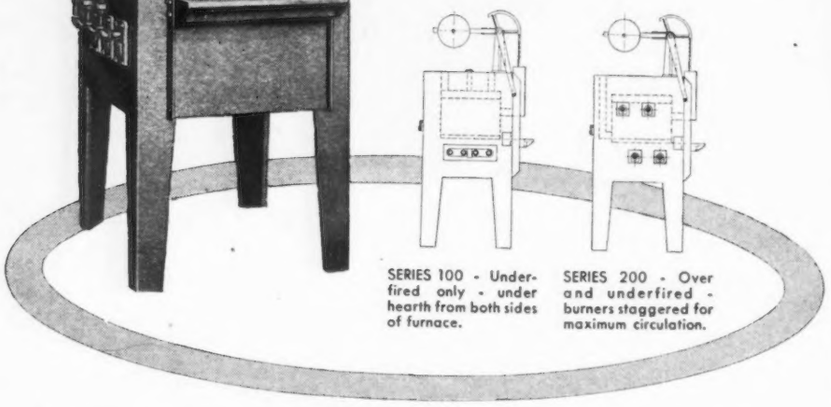
HOUGHTON PRODUCTS FOR THE METAL INDUSTRIES

"Economy and Uniformity of Work for 20 Years" with a MAHR TOOL FURNACE

One user writes, "The economy and uniformity of work that has been put through this furnace since it has been in continuous operation in our plant for the past 20 years, makes us doubt whether it would be profitable to discard this furnace, even with the great progress that has been made in that length of time."



Not only do MAHR Tool Furnaces have an enviable record for a long, useful life—they also handle the many classes and grades of tool and other steels requiring a wide range of treatment for many service conditions.



SERIES 100 - Underfired only - under hearth from both sides of furnace.

SERIES 200 - Over and underfired - burners staggered for maximum circulation.

UNIFORM HEAT DISTRIBUTION is provided by correct size, number and arrangement of burners, combined with efficient design of hearth and combustion chamber, plus adequate venting for spent gases. The MAHR Tool Furnace is made in 13 sizes with hearths from 9" x 13½" to 18" x 36".

For temperatures 1200° F. to 2000° F. specify the MAHR "Under Fired" Furnace. "Over and Under Fired" Furnaces will handle temperatures 2100° to 2600° F. There's a MAHR Engineer representative near you to assist you with any of your heat treating problems. Write for Bulletin No. 100 on MAHR TOOL FURNACES, or any other MAHR products listed in panel.

MAHR MAKES:

Tool Furnaces Muffle Type
Box Type Electric Heat Treaters
Recirculating Cylindrical Furnaces
Pot Furnaces, Gas, Oil, Electric
Forging Furnaces
Portable Smithing Forges
Rivet Heaters
Safety Vacuum Torches
Burners, Blowers, Fans
Electric, Gas and Oil Fired Furnaces for every heat-treating operation.

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MAHR
ENGINEERS • DESIGNERS • MANUFACTURERS
ALL EQUIPMENT FOR METAL HEATING

MAHR MANUFACTURING CO.
DIVISION OF DIAMOND IRON WORKS, INC.
1703 No. Second St.
Minneapolis 11, Minn.

(CONTINUED FROM PAGE 154)

envisaging their wide use in places lacking public utility facilities, for use as standby power units, and for irrigation.

In a third project, two liquid-cooled Allison engines are being installed in a 53-ft power launch by the Louisiana Materials Co., of New Orleans. The engines were designed for use in a P-38 Lightning fighter and rotate in opposite directions, thereby lending themselves to adaptation to a twin-screw boat. For greater ease of operation, the engines are being fitted with airplane controls.

While this project is still in a developmental stage, engineers estimate that the two aircraft engines will give the boat a speed which may reach 45 knots. The company will use the boat for the fast transportation of trouble shooter crews to its fleet of tugboats, operating in the Gulf of Mexico.

In order to broaden the scope of its experimental program, the RFC has a contract with the industrial engineering firm of Ford, Bacon & Davis of New York, for a thorough study of all possibilities for the utilization of surplus aircraft engines for nonaviation purposes. This is a major surplus disposal problem, as the RFC now has over 20,000 in surplus, and many additional thousands are expected to come into surplus. Added to these will be a great number of engines which are being removed from surplus tactical type aircraft preparatory to scrapping.

While many of the types which are in best condition and readily suitable for further aircraft use will be absorbed by civil aviation, the majority are of types which are obsolete.

In order to encourage widespread developmental work on nonaviation uses for surplus engines and other equipment, the RFC will enter into an experimental engineering contract with reputable industrial and engineering firms or individuals. Under these agreements, the RFC makes surplus engines and equipment available to private industry for experimental purposes but retains title. The contractor pays shipping costs and is required to insure the equipment and return it to the RFC when the contract is completed.

Notes on STEEL CASTINGS

Check up on

PSF QUALITY

for your High Tensile Jobs

When you're on the lookout for steel castings that must develop high tensile strength, look in on PSF. Castings for highly stressed applications or pressure work are a specialty of ours—a field in which we have a rich background of experience and proved performance. Illustrated above are a number of locomotive wheel centers, cross heads, driving boxes, etc., cast from alloy steel and heat treated for special characteristics. The alloy is a distinctive analysis with PSF, but—and this is important—we've also developed treatments that get remarkable strength results with ordinary carbon steel. Let us check with you on your high-tensile jobs—in fact, *all* of your steel casting requirements, in any size from a pound or two to fifty tons and over.

47 YEARS OF STEEL CASTING KNOWLEDGE

Pittsburgh

STEEL FOUNDRY CORPORATION

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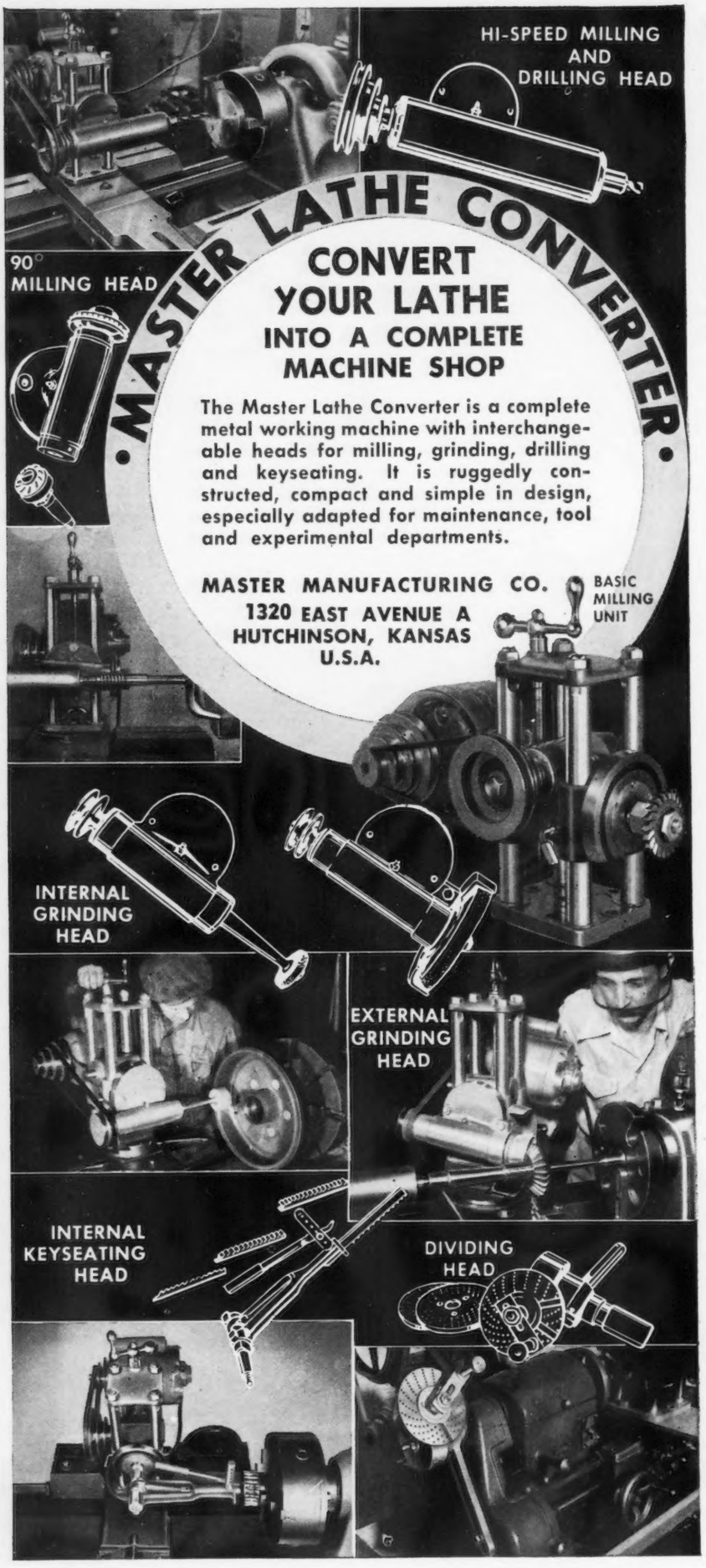
HI-SPEED MILLING AND DRILLING HEAD
MASTER LATHE CONVERTER
90° MILLING HEAD
CONVERT YOUR LATHE INTO A COMPLETE MACHINE SHOP
The Master Lathe Converter is a complete metal working machine with interchangeable heads for milling, grinding, drilling and keyseating. It is ruggedly constructed, compact and simple in design, especially adapted for maintenance, tool and experimental departments.
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BASIC MILLING UNIT
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INTERNAL KEYSEATING HEAD
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Aircraft Powerplant Engineers See High Place for Jet Engines

Detroit

• • • **Jet engines were** assigned high priority position on the agenda of aircraft powerplant engineers at the 1946 annual meeting of the Society of Automotive Engineers in Book-Cadillac Hotel here this week. Speakers at the Aircraft Powerplant Session asserted that the jet engine's simplicity is somewhat deceptive and that considerable research lies ahead, but that it promises advantages with progress.

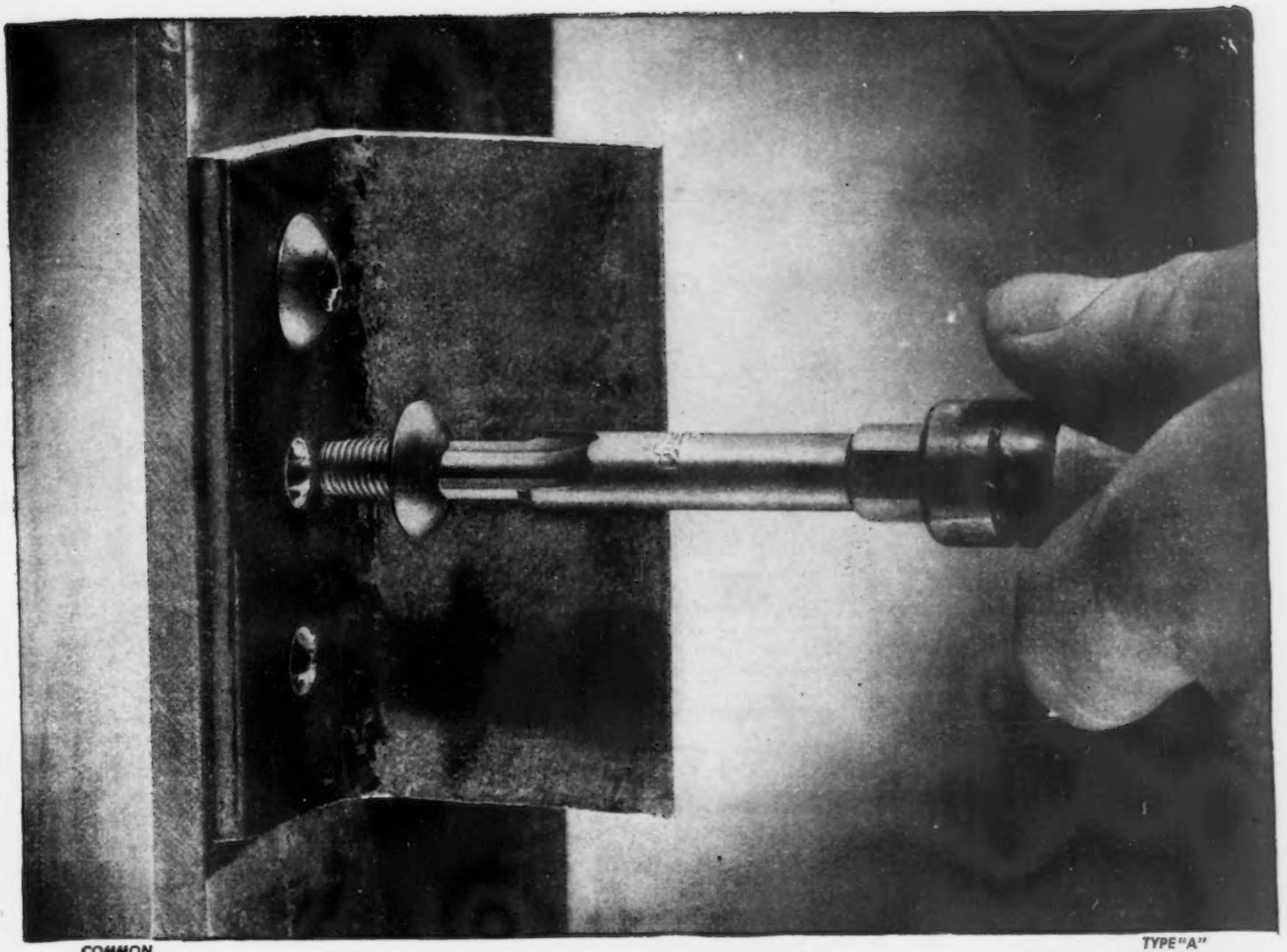
William R. Hawthorne, of Ministry of Aircraft Production, London, England, said that jet engine design permits of analytical calculation to an extent hitherto impracticable, and enables the engineer to predict performance with greater confidence than ever has been possible with reciprocating engines.

"The aircraft engine designer of the future," he added, "will be preoccupied less with problems of mechanical design and more with problems of fluid motion than his predecessor." Mr. Hawthorne explained that each component of the jet engine may be put through separate processes of aerodynamic development on suitable test rigs, permitting the designer to plan various arrangements and to assess their merits.

Great need exists for research, he said, especially in the fields of metallurgy, for the purpose of developing materials highly resistant to creep, fatigue, oxidation, erosion, and extreme stresses and temperatures; in aerodynamics, where knowledge of compressible flow is lacking; in the control of gases moving at high speeds; and in the aerodynamics of combustion.

Opinion was expressed by Frank C. Mock, of Bendix Products Div., Bendix Aviation Corp., South Bend, Ind., that jet engine design should start with the combustion chamber in order to avoid troubles already being experienced in the form of hard starting, excessive temperatures, blow-out, and die-out.

"Most of us," he said, "having had casual experience with combustion all our lives, and all the way from bonfires to blowtorches,



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TYPE "A" ASSEMBLY BIT

There Is No Tougher Test in assembly than the driving of thread-forming screws; especially where the thickness of the metal equals or exceeds the diameter of the screw. This is the critical spot where CLUTCH HEAD'S special features, *of both screw and driver,* challenge point by point comparison... for lower cost, efficiency, speed, and safety.

- ✓ Rugged Type "A" Bit construction for longer uninterrupted service and longer total life, plus simplified reconditioning, means fractional tool maintenance and assembling costs.
- ✓ Automatic dead-center entry with the Center Pivot for the speed and certainty of *straight* driving.
- ✓ Square instead of "tapered" engagement . . . a *straight*-sided driver contacting *straight*-walled Clutch recess . . . eliminates ride-out and reduces end pressure to a minimum.
- ✓ Positive engagement for definite torque drive; no chewed-up heads; no hazard of slippage to injure manpower or damage materials.
- ✓ The CLUTCH HEAD Lock-On which carries screw and bit as a unit for fast one-motion driving.
- ✓ And . . . an ordinary type screwdriver will service CLUTCH HEADS.

You are invited to make your own test of these and other exclusive advantages by asking us to mail you package assortment of CLUTCH HEAD *Screws, sample TYPE "A" Bit and fully illustrated brochure.*

CLUTCH HEAD · SCREWS ·

UNITED SCREW AND BOLT CORPORATION

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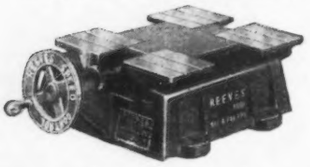
How to convert any standard constant speed motor to a low-cost Stepless Variable Speed Drive . . .

1

Mount Your Motor on This REEVES Motor Base



Base is built in wide range of sizes to fit any standard constant speed motor up to 15 h.p. Includes sliding platform and handwheel for moving motor forward or back.

2

Apply This Disc Assembly to Motor Shaft

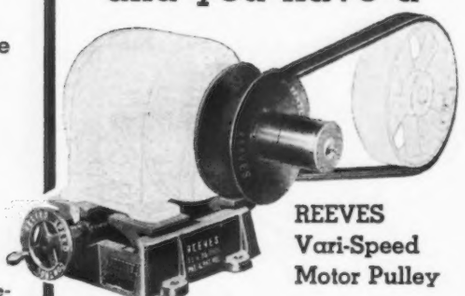
Assembly consists of two facing cone-shaped discs, one stationary, the other sliding laterally, and compression spring for mounting on extension shaft of motor.

3

Connect to Driven Machine With This Special V-Belt

Place specially designed REEVES V-belt between discs and over pulley on power input shaft of the driven machine. Adjust belt to minimum center. Anchor motor base.

and you have a



REEVES Vari-Speed Motor Pulley

available in sizes to 15 h.p. for stepless speed adjustability within 4:1 range.

HOW IT WORKS: The operation of a REEVES Motor Pulley is extremely simple—yet it follows the time-tested REEVES principle of a V-belt traveling between the adjustable driving diameters of cone-shaped discs. By turning handwheel, motor is moved forward or back on base, varying the driving diameters of the discs. As motor is moved toward driven machine, belt rides higher between discs, thus increasing the speed transmitted. Turning handwheel in opposite direction reverses the operation. Any speed within the range is accurately maintained.

WHAT YOU CAN DO WITH IT: The REEVES Motor Pulley is the simplest dependable method of providing infinitely variable speed adjustability to a driven machine. With this low-cost, easy-to-install equipment you can transform a machine with fixed speeds into a far more versatile production unit—one that is instantly responsive to every changing condition and work schedule. Install REEVES Motor Pulleys on your machines in service, and when you buy a new machine, look for the familiar REEVES handwheel that signifies REEVES-equipped.

For complete information on this and other REEVES units, send for Catalog 1-450

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Recognized Leader in the Specialized Field of Speed Control Engineering

Accurate Variable

REEVES Speed Control

Gives the Right Speed for Every Job!

consider ourselves experts, and we tend to think this jet burner art is easy. This subject has not received sufficient attention thus far. Our engines are not aircraft engines, and our jet aircraft are not military service aircraft, unless combustion is positive and dependable under operating conditions. Therefore, the combustion chamber should be one of the first elements to be experimentally proven before a given engine arrangement is adopted."

Interest in the technical papers was shared with one of the most complete jet engine exhibits ever assembled in this country. It included the German Jumo 004, the General Electric I-40, both loaned by Air Technical Service Command, Wright Field, Dayton, Ohio; and a Heinkel-Hirth HES-SA, a BMW-003A, and a Westinghouse 19-B, loaned by Powerplant Section, Navy Dept., Bureau of Aeronautics.

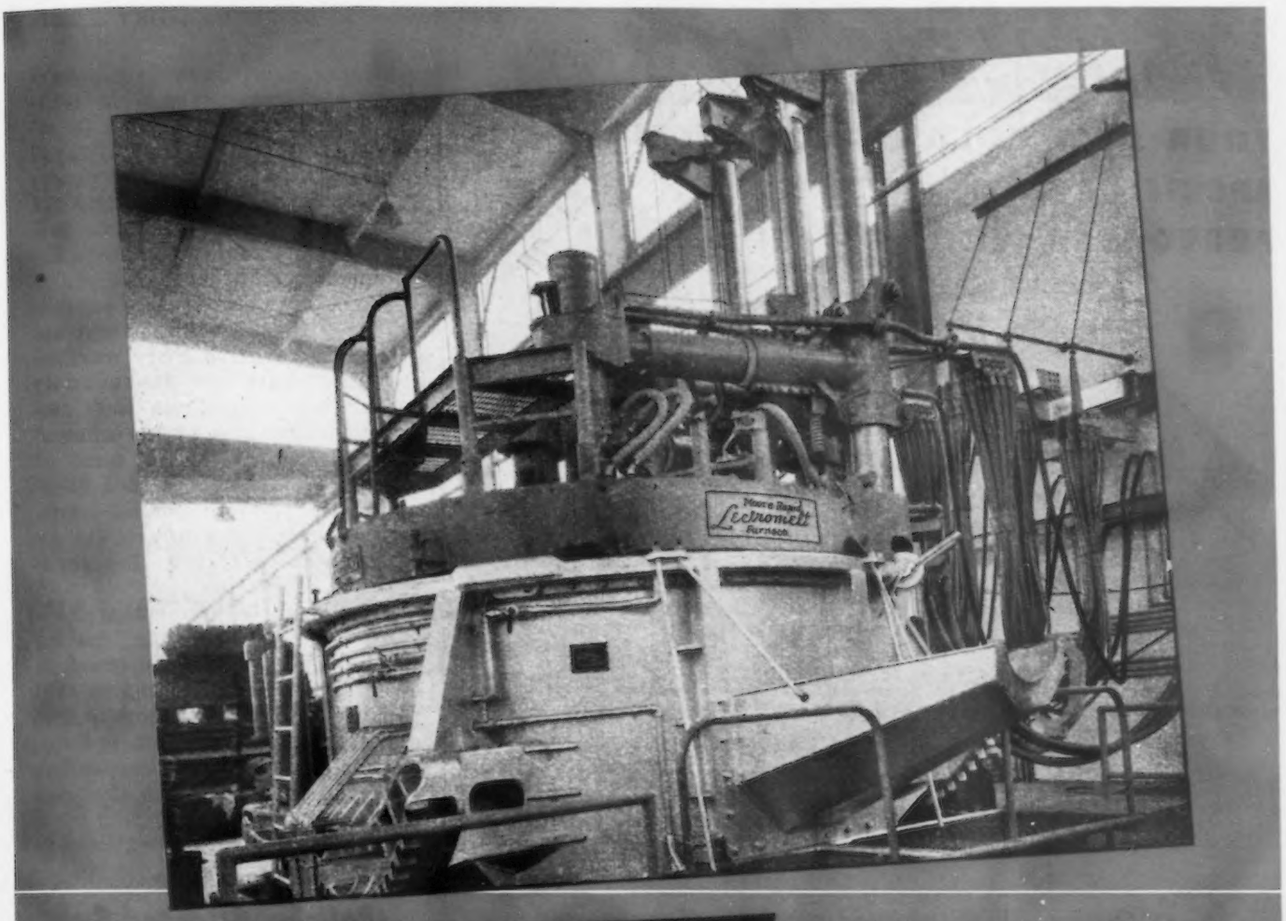
Commercial Use Of Wartime Developments In Electronics Urged

Washington

• • • **An interim program**, pending the enactment of suitable legislation by Congress, to remove the barriers against utilization by the radio and electrical manufacturing industries of valuable wartime developments in electronics, providing for the establishment of a cooperative non-profit organization, has been recommended by the War and Navy Depts.

A Joint Army-Navy Committee, appointed by the secretaries of the two departments to seek a solution to this multi-million-dollar problem, has filed recommendations that a cooperative non-profit organization be established to administer electronic patents resulting from the radar program and to license manufacturers to take advantage of these developments.

The legal problem, which so far has blocked commercial use of many significant wartime developments, results from the fact that considerations of military secrecy made it impossible during the war for the government to permit action upon patent applications relating to many radar and other electronic developments. In



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The top charge feature of Lectromelt allows the placing of full charges quickly. Only a few minutes are required between heats, if the charge bucket is filled while the previous heat is melting. Top charging permits the use of either large bulky scrap or light fluffy scrap. Top charging results in reduced power, electrode, and refractory consumption. The simplified construction of Lectromelt Furnaces has made top charging practical, efficient and economical. Lectromelt Furnaces of the top charge type are available in capacities ranging from 100 tons to 250 pounds. Write for complete details.

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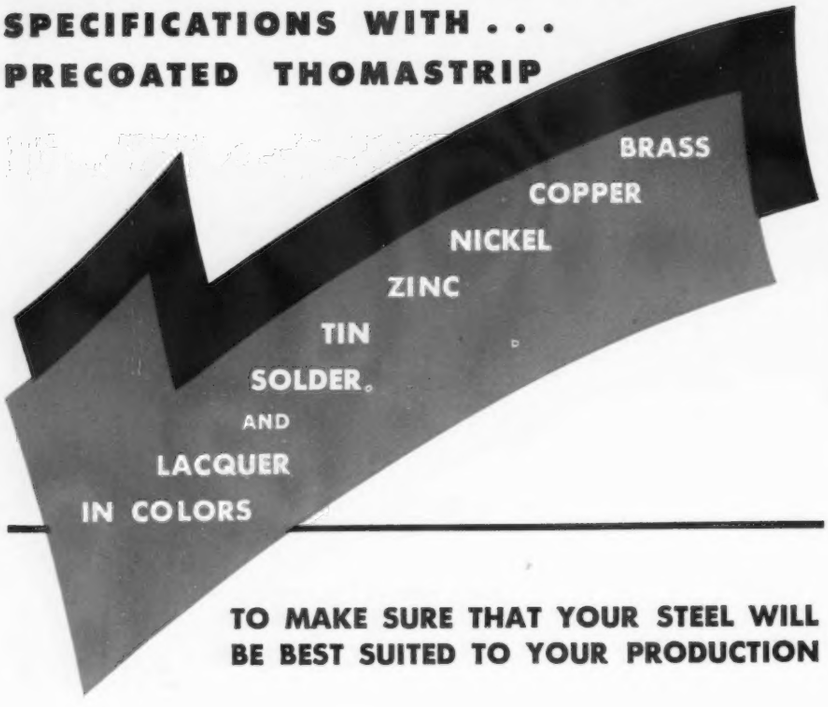
YOUR NEW COLD ROLLED STRIP STEEL SPECIFICATIONS WITH . . .

PRECOATED THOMASTRIP



TO MAKE SURE THAT YOUR STEEL WILL BE BEST SUITED TO YOUR PRODUCTION

DOUBLE-CHECK the advantages of precoated ThomaStrip before you make a decision on material to be used for your postwar products. Precoating lends versatility to cold rolled strip steel by providing a means of eliminating a part or all of your plating problems — a coating that can be supplied or processed in high luster finish for customer appeal — and coverage of all surfaces for protection of base metal and quality of product. Write today, giving details of your specific problem.

ThomaStrip
COLD ROLLED STRIP STEEL
COATED AND UNCOATED

For: Uniform coating
Base for further plating
Brazing • Soldering
Improved die life
Ultimate finish

SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

THE THOMAS STEEL CO.
WARREN . . . OHIO

addition, many important inventions and improvements in technique were made available to radar manufacturers on a large scale with little regard to patent or license considerations, and the manufacturers in turn made further improvements upon these developments and techniques.

The situation is further complicated by the fact that patent applications covering these wartime inventions have been filed not only by private individuals and corporations but also by government research agencies, and some of the discoveries upon which these applications were based were made almost simultaneously by researchers working independently of each other.

The committee found that "privately held electronic patent rights are so widely dispersed in ownership, so interrelated in subject matter, and so numerous that obtaining licenses on an individual basis is practically impossible, either to industry or to the government."

ICC Rate Increase Policies Attacked By Steel Traffic Chief

Chicago

• • • **Interstate Commerce** Commission policy of making general freight rate increases on a percentage basis was attacked by E. G. Plowman, traffic vice-president, U. S. Steel Corp. of Delaware, in a recent address here before the Junior Traffic Club of Chicago.

This method brings about widening of marketing spreads and thus reduces the size of possible marketing areas, Mr. Plowman pointed out. He urged traffic managers to attempt to persuade the commission and rail carriers that this policy should be abandoned in "coming freight rate increase of 1946."

A trend towards application of uniform mileage scales, particularly of the class rate type, was seen by Mr. Plowman who called attention to its effect upon the economic or profitable size of factory units.

Peacetime application of palletizing unit loads, exploited during the war by the armed forces, was pointed out as a possibility to reduce rehandling, breakage, and

Industry's Favorite Gun!

IT'S THE DEVILBISS MBC—LEADER OF THE FULL LINE OF DEVILBISS GUNS THAT SPRAY EVERYTHING FROM PAINT TO FLOCK

Wherever you go, in industries from coast to coast, you'll find the DeVilbiss MBC Spray Gun at work. No other spray gun is so widely used for so many purposes. It is the leader of all spray guns because of its proved performance and longer life.

In addition to this famous spray gun, DeVilbiss builds other specialized guns to meet every finishing and coating requirement. Guns to spray all materials, even adhesives, flock and sound deadeners. Suction and pressure feed guns. Lightweight guns for women. Guns for shading and other decorative effects. Automatic spray guns. And each is pre-tested at the factory with materials of the type it will spray on the job to make sure its performance is up to DeVilbiss standards.

The spray gun is the heart of the finishing system. DeVilbiss leadership in spray gun developments is one more reason why you can depend on DeVilbiss for better results in your finishing and coating operations.

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DEVILBISS TYPE CM
for medium production

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for delicate touch-up

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means **Quality** *in all four..*

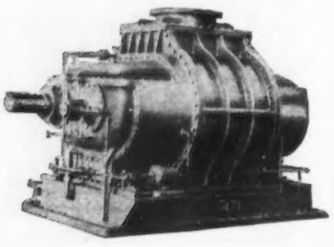
SPRAY EQUIPMENT
EXHAUST SYSTEMS
AIR COMPRESSORS
HOSE & CONNECTIONS

PLENTY OF BOOST REQUIRED

• Gas doesn't just flow unaided to your kitchen range or factory burners. To maintain even pressure, it must be boosted along, and that's one of the big jobs for Roots-Connersville gas pumps.

It doesn't make any difference to these positive displacement boosters what the temperature or barometer reading is, or how many BTU's there are in a cubic foot, R-C equipment just pushes the gas, steadily and surely, to give you fuel where and when you want it, for your morning eggs or your manufacturing processes.

So simple is the design and so sturdy the construction of R-C units that many of them have been in profitable service for more years than most men can remember. Some applications are:



Every minute, this heavy-duty R-C unit pumps 15,000 cubic feet of manufactured gas. Equally sturdy and dependable R-C units are available down to 10 CFM capacity.

Proportioning and mixing gases
Acid-making processes
Foundry cupolas
Ore concentrators
Vacuum filtration processes
Paper folding machines
Chemical and food processing
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The continued fine performance of R-C units is the result of our *dual-ability* to engineer and build to the most exacting specifications. If you have a problem of moving air, gas or liquids under moderate pressures, consult us.

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ROTARY POSITIVE AND CENTRIFUGAL BLOWERS • EXHAUSTERS • BOOSTERS
LIQUID AND VACUUM PUMPS • METERS • INERT GAS GENERATORS

time and cost factors. Careful study of all factors involved by experienced traffic executives and cooperation by traffic managers with other departments was recommended.

Publication of a national switching tariff, becoming effective Jan. 1, was described as a logical step by Mr. Plowman. Development of best possible switching practices at each particular plant twas classed as a duty of all traffic managers.

Rust Contracts Total $30 Million in 1945

Pittsburgh

• • • **Contracts for** approximately $30,000,000 for design and construction of industrial plants and facilities were awarded the Rust Engineering Co., Pittsburgh, in the past year, S. M. Rust, Jr., president, reported.

The demand for industrial building in 1946 appears considerably in excess of the past year, but the extent to which it can be satisfied is uncertain due to government controls and labor and material conditions, he also commented.

Mr. Rust said: "The abnormal rate of wear on all industrial facilities during the war, coupled with advances in production processes and new products, have brought a large volume of inquiries about plant expansions and new building in 1946.

"However, present conditions make it only possible to guess at the extent to which this work can be fulfilled. The undeterminable factors are government controls, the availability of construction workers, particularly in the skilled trades; and availability of materials. Labor controversies may also impede building plans in some industries."

Rust's work in 1945 included a large amount of plant expansions in the paper, chemical and metals industries. In the latter an unusually large number of furnaces were rebuilt or new ones constructed. The company was also extensively engaged in renovation of worn installations and the reorganization of plants for peacetime production. It also engaged in numerous ordnance projects before the war's end.

INGERSOLL FACE MILL CUTTERS

Available from Stock

TYPE NX Heavy Duty Series face milling cutters designed for geneal purpose work are suitable for taking ½" cuts on both the face and periphery in cast iron or steel. Serrated high speed steel blades are locked in the cutter housing by wedges and screws. Chip clearance is milled in the housing to prevent chips clogging on heavy cuts. The following sizes are available in stock both right and left hand.

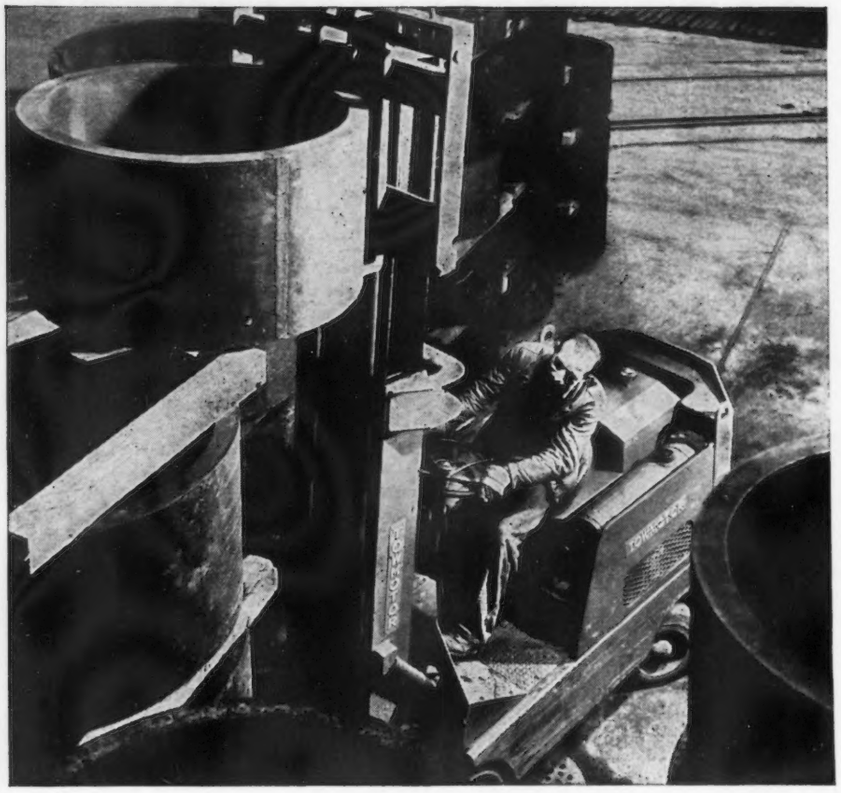
Cutter No.	Diameter	No. Blades	Cutting Face on Periphery	Price
8104X	4"	10	1-¾"	$30.00
8106X	6"	10	2-½"	35.00
8108X	8"	14	2-½"	45.00
8110X	10"	18	2-½"	60.00
8112X	12"	20	2-½"	78.00

SHEAR CLEAR Heavy Duty Series face milling cutters will out-perform any existing designs for work in tough steel and in the soft, stringy, non-ferrous metals. Designed for ½" deep cuts. The Shear Clear is a patented design using steep negative rake and positive shear angles which cause chips to coil outward away from the cutter. The following sizes with high speed steel blades are available in stock both right and left hand:

Cutter No.	Diameter	No. Blades	Price
7106X	6"	12	$58.00
7108X	8"	16	75.00
7110X	10"	20	100.00
7112X	12"	22	120.00

Write for catalog giving complete details on inserted blade milling and boring tools.

THE INGERSOLL MILLING MACHINE CO., ROCKFORD, ILLINOIS



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TO MEET customer demands for closer delivery schedules and faster production, The Reliance Electric & Engineering Company, Cleveland, Ohio, realized that an adequate inventory of raw materials was essential. However, a shortage of storage space thwarted this plan to avert delays in production.

Turning to Towmotor, Reliance devised an entirely new method of storing and handling raw materials. Using an outdoor storage area, Towmotor stores and stacks all raw materials, has increased storage space 300%. Even huge, cumbersome 1500-lb. frame rings are easily stacked five high by Towmotor. The additional storage space provided makes it possible to purchase raw materials in mill lots, effecting considerable savings in purchase price and assuring an ample supply of materials. The valuable inside space formerly needed for storage is now devoted to productive machinery.

For every handling problem there is an engineered solution . . . a solution based upon Towmotor experience and know-how gained in solving handling problems in every industry. Send for your copy of the Towmotor Lift Truck ANALYSIS GUIDE today. Towmotor Corporation, 1230 East 152nd Street, Cleveland 10, Ohio.

TAKE IT UP WITH

TOWMOTOR

THE ONE-MAN-GANG

Prefabricators' Poll Indicates a Yearly Capacity of 150,000

Washington

• • • **Prefabricated home** manufacturers have the production capacity to make 150,000 or more homes in 1946, Harry H. Steidle, manager of Prefabricated Home Manufacturers' Institute, revealed recently, in disclosing the results of a survey of the factory-built home industry.

In this survey 50 leading prefabricators in 30 states were asked by the institute to estimate the number of homes they can build this year, working on a single-shift basis, provided essential building materials are made available to feed their production lines.

Of the 150,000 homes, 30,000 could be furnished during January, February and March, when conventional building generally is impossible; and 65,000 during the first six months of 1946, the survey showed. The report continued:

These homes, like the postwar homes which prefabricators are producing now on a limited basis due to the shortage of certain materials, will be permanent, attractively styled, well-designed homes. They will sell in a price range well under the $10,000 limit prescribed in the government's new construction program designed to encourage production of homes for veterans.

Marked increase in the production of homes could be quickly accomplished by priority assistance toward the development of a 60-day working inventory of lumber, plywood, millwork, paint, roofing and perhaps several other items essential to home construction against which the prefabricated home builder can operate, which materials could be later replaced by the HH priority ratings on homes sold.

The production of factory-built homes got its real test in the war years when the industry produced temporary war housing to the extent of more than a quarter million units in an incredibly short space of time, Mr. Steidle said.

Recognizing the need of high quality for its peacetime production, the manufacturers of prefabricated homes obtained the cooper-

CONTINENTAL

UNDER ONE NAME, ALL THESE STEEL PRODUCTS

● Manufacturers are looking more and more to Continental for manufacturer's wire, steel sheets, and many finished steel products:

It's a good idea. Continental supplies wire as thin as thread or as thick as rods, in standard and special shapes and many different finishes and coatings . . . steel sheets in 30 different surface treatments . . . steel roofing and siding to protect your buildings against weather . . . Chain Link fence to guard your property . . . and nails and staples in a variety to meet any need.

We invite your inquiries. Get more information about the Continental line for manufacturers. Write for a copy of the Manufacturer's Folder today.

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GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF STEEL SHEETS, including GALVANIZED, COPPERIOR (copper-steel base) Galvanized, KONIK steel sheets Galvanized, CHECKERCOAT Galvanized, Hot Rolled Annealed, Hot Rolled Pickled, and many styles of Galvanized Formed Roofing. **ALSO,** Manufacturer's Wire in many sizes, shapes, tempers and finishes, Continental Chain Link Fence, Nails, and other steel products.

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Getting metals clean is often a ticklish job, too. Yet it's a mighty important one—especially in these busy days when new metal-cleaning problems are developing in reconversion work.

That's why so many progressive plants depend on Wyandotte Metal Cleaners. There's one of these *specialized* products to meet almost any metal-cleaning need—for cleaning after machining and prior to plating, painting, lacquering, anodizing, spot welding.

The Wyandotte Representative is ready to give you specialized help, also, on your metal-cleaning problems. It will pay you to consult him—you'll save time, labor and money.

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Service Representatives in 88 Cities

ation of the U. S. Bureau of Standards and developed standards for the guidance of the home owner and the financial agency and have since come out with a certificate by which they assure the buyer of conformity to these high quality standards.

Another assurance of their value is in the fact that they are, for the most part, acceptable for FHA mortgage insurance and are in every sense of the word, high quality, well designed, permanent homes in which the major portion of the construction work has been performed under factory conditions with modern high speed equipment, the survey reported.

Industrial Capacity Seen Instrument Of Total Modern War

Washington

• • • **In an address before** the Army Industrial College on Jan. 7, Fleet Admiral Chester W. Nimitz emphasized that modern war is total and that no nation can wage successful war which fails to utilize its industrial capacity to the fullest extent. It is not enough, he said, to have a great industrial plant. The plant, he pointed out, must be mobilized, supplied and made an integral part of the war machine.

"World War II was won because we were able to mobilize our industry efficiently, and utilize our resources to the utmost," Admiral Nimitz declared. "The enormous Navy and Merchant Marine shipbuilding program was possible only because we harnessed the nation's total industrial potential. Our aircraft industry was also expanded beyond anyone's expectations. These programs were carried out without undermining any essential civilian economy. But there were many instances of blundering and serious miscalculation. Many items had to be redesigned for mass production, or to utilize materials actually available. In many instances, unrealistic and conflicting specifications handicapped industry. We simply cannot afford to make these same mistakes in the future. The time to correct them is now."

He told the class, composed largely of senior officers with experience in procurement, or in mobilization of industry for war, that it must work out ways to eliminate con-

REDUCE DEAD-WEIGHT—

INCREASE PAY LOAD WITH

J & L OTISCOLOY

HIGH TENSILE STEEL SHEETS

Otiscoloy high tensile steel sheets offer the design engineer new opportunities to eliminate bulk and dead-weight in new products. With 50,000 P.S.I. minimum yield point, 70,000 P.S.I. minimum tensile strength, 25% elongation in two inches, Otiscoloy is ideally suited for many applications. Otiscoloy resists corrosion, abrasion and has excellent weldability. It forms hot or cold. J&L Otiscoloy is now available in sheets, strips, plates, Jal-Tread floor plate, Junior Beams, Junior Channels, Electricweld tubing and hot and cold finished bars.

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PITTSBURGH, PA.

The WORK of a GIANT

• Within these walls a giant stands ready to work for you. Giving him no thought at all, you touch the control button. At your command his mighty muscles go into action and the load moves.

The operating mechanism of Shepard Niles hoists is completely enclosed, assuring permanent alignment—more durable, trouble-free, efficient service. Whatever your lifting or handling requirements may be, there's a Shepard Niles hoist for the job—more than 5,000 types and sizes.

Powerful and rugged, Shepard Niles Cranes are available in any desired capacity and span—designed to handle greatly varying loads with precision, safety and economy. Shepard Niles Cranes have the same sound, progressive features as do the Shepard Niles Hoists. A request will promptly bring illustrated bulletins.

Shepard Niles
CRANE & HOIST CORPORATION

The experience and facilities of Shepard Niles engineers are at your service. Plan ahead now for the right material handling equipment. Your inquiry will receive prompt attention.

356 SCHUYLER AVENUE • MONTOUR FALLS, N. Y.

flicts in procurement and purchase practices between armed forces and between subordinate activities within the same department. These practices were declared to be wasteful and frustrating and confusing to industry.

The class was told that its purpose was not so much to learn what has been done in the past as to evolve new and dynamic plans for the future. Its plans, he declared, should be broad in conception and design, a framework within which intelligence and ingenuity will have free play, so constituted that elements can be easily discarded as they become obsolete or ineffective. Industry and labor must have a voice.

"Be alert to avoid prejudice and complacency which so often sap the strength of large organizations," Admiral Nimitz said.

"All of us must work under the assumption that an emergency is imminent," he admonished. "In the two great wars we have fought in this century, we have had relatively long unmolested periods to marshal our resources. We shall not be so fortunate again. Plans must be so well developed that they can be put into operation literally overnight. I urge you to keep this dominate factor of time before you constantly."

Grant $2 a Day Increase

Warren, Ohio

• • • **A general wage increase** of $2 per day was awarded employees of Federal Machine & Welder Co., in supplemental contracts signed with two UERMWA locals, immediately affecting 600 employees.

Malcolm S. Clark, president of Federal Machine & Welder Co., signed the contracts with union officials, and said that Federal expects to recall employees of Warren City Mfg. Co., recently purchased by Federal, as rapidly as possible. About 375 were recalled early last week.

Captive Coal Mines Close

Cleveland

• • • **As a direct result** of the steel strike, nearly 1800 were idle in the Western Pennsylvania coal fields this week as the Republic Steel Corp. closed two coal mines, the Clyde mine near Fredericktown, Pa., and the Crescent mine No. 2, near California, Pa. The two mines daily output is about 8000 tons of coal.

Chicago Ordnance Area Materiel Procurements Amount to $5 Billion

Chicago

• • • **Recapitulation of** activities of the Chicago Ordnance District during the defense and war period shows that since June 30, 1941, over $5,300,000,000 worth of ordnance materiel was procured, a total exceeded by only one other district, Detroit.

This compares with production of approximately $6 billion worth of ordnance by the entire country during World War I.

During the war period just ended the Chicago district led all other districts in the production of ammunition and artillery and was the second largest producer of tanks, automotive vehicles and small arms. It accounted for approximately one-fifth of the nation's total ordnance procurement.

By years, the Chicago district's production was: 1941, $57,805,000; 1942, $684,484,000; 1943, $1,835,117,000; 1944, $1,671,632,000; and 1945, $1,052,878,000. Cumulative production by the district's four commodity branches was: Tank-automotive $2,703,221,000; Ammunition $1,530,220,000; artillery $571,963,000; and small arms $496,512,000.

Contract terminations by the district are in the final stages according to Col. John Slezak, retiring district chief, and no reconversion activities are being hampered by contract termination work. The district received 4367 contracts for termination during the 1941-45 period, most of them in the past two years. By the end of January, the district will have less than 20 contracts on which termination work is incomplete. Only nine termination inventories have yet to be received by the district with the exception of three large cost-plus contracts which were finished in December.

The district has recently placed orders for research and development work costing $6 million, Col. Slezak said. No program has yet been laid out for so-called "educational" orders such as preceded the war, but Col. Slezak pointed out that the larger reservoir of production experience makes these largely superfluous at present.

Col. Joel G. Holmes, who served

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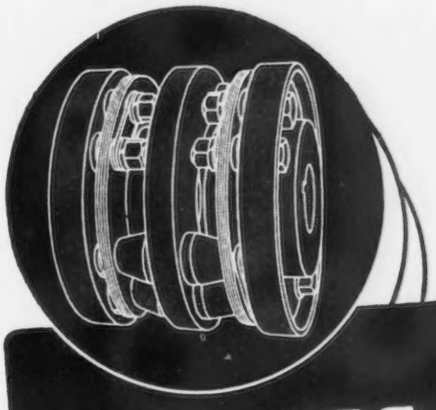

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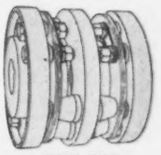
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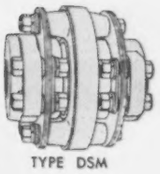
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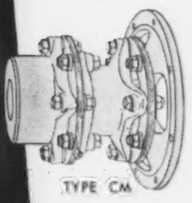
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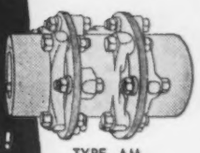
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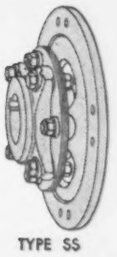
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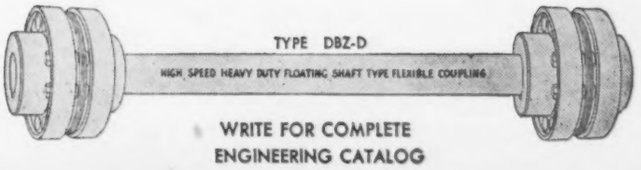

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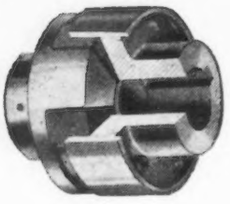

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as deputy chief ordnance officer for the European theatre of operations from June 1943, to February 1945, succeeds Col. Slezak as district chief. Col. Slezak, a reserve officer, returns to his position as president of the Turner Brass Works, Sycamore, Ill.

Says Union Membership Increased 11 Million Between 1930 and 1945

Chicago

• • • **Union membership** increased from between 3 and 3½ million persons in 1930 to between 14 and 14½ million in 1945, Edgar L. Warren, director, U. S. Conciliation Service, told the Assn. of Commerce here recently.

"We can make a reasonable guess that the terms and conditions of employment of approximately 47 pct of the working population (excluding agriculture, domestic service, government and self employed) are determined by about 50,000 collective bargaining contracts," Mr. Warren said.

"Every day approximately 100 of these contracts are being reopened and rewritten."

He declared that the productive capacity of the country has more than doubled during the past 15 years due to improvements in manufacturing processes and increased output per man hr.

"During the fiscal year from July 1, 1944, through June 30, 1945, the U. S. Conciliation Service handled almost 26,000 cases, including more than 5000 strikes and threatened strikes. About 7500 of these cases, or little more than one fourth, were of the type that could not be settled by normal mediation and conciliation processes and were referred or certified to the War Labor Board for final determination under its extraordinary wartime authority," Mr. Warren said.

Mr. Warren pointed out that, in addition to the War Labor Board, divisions of the War Production Board, War Manpower Commission, the Army, the Navy, and other procurement agencies engaged in labor-management relations have passed out of this picture. Therefore, he saw an increasing burden to be carried by the Conciliation Service.

"The Conciliation Service seeks to persuade the parties to settle

their differences by compromise rather than by an appeal to strike or lockout. The Service has no enforcement authority nor is it in a position to determine the merits of any issues in dispute.

"Where both the company and the union have stipulated to the appointment of an arbitrator and have agreed to be bound by his decision the arbitration division will appoint such an arbitrator from its staff or from a list of arbitrators who have been approved by both industry and labor people."

CofC Proposes New Government Council To Aid Legislature

Washington

• • • **Creation of an Economic** Commission to make advisory recommendations to government for the fullest utilization of the nation's resources within the framework of a free and voluntary society is proposed by a committee of the Chamber of Commerce of the United States.

In putting forward the proposal, the Chamber's committee on economic policy asserts that there are no simple or pat preventives or remedies for economic ups and downs, with accompanying fluctuations in employment.

"Because our economic system is primarily and fundamentally a voluntary system, under which the consumer and the investor have freedom of action, and because we are deeply concerned with the survival of this freedom," says the Chamber committee, "we cannot expect that the wave-like movement of business activity can be promptly and completely removed."

The committee does not take the attitude that nothing whatsoever can be done to check surges and recessions in the movement toward economic progress. It has a number of suggestions designed to assure an adequate supply of constant job opportunities.

"The issues are so controversial and complicated that we recommend the appointment by the President of the United States by and with the advice and consent of the Senate of a permanent Economic Commission, composed of out-

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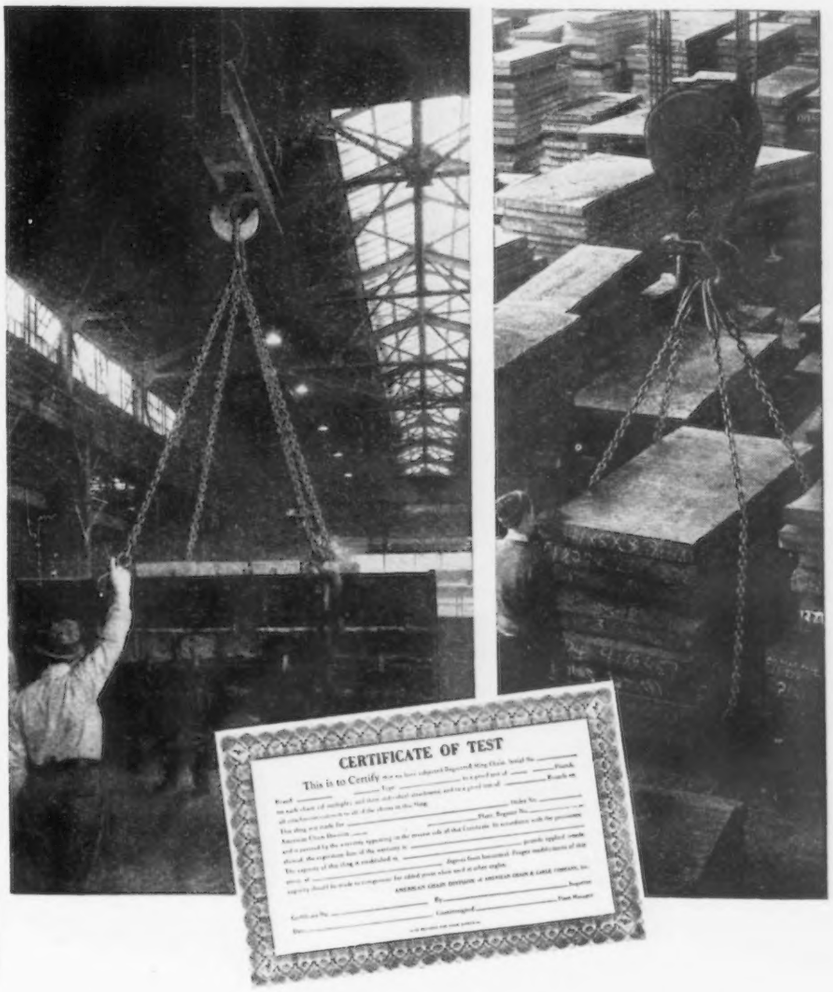

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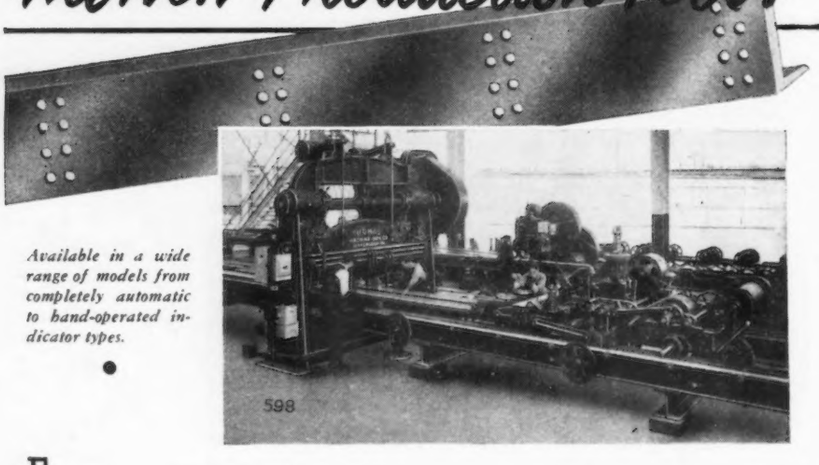

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standing experienced citizens of unquestioned ability and integrity. These persons should be drawn from fields dissociated from politics and the interested parties. They should be appointed on a reasonably long-term basis, with staggered terms and subject to reappointment, with adequate compensation in order to draw the very best talent available."

The Commission would make quarterly and annual reports to a joint Senate-House committee and to the President, especially with a view toward recommendations "as to the inner consistency of government policies and always with the objective in view of maintaining the full utilization of all of our resources, both human and physical within the framework of a free and voluntary society."

The Commission should be completely independent and it would make advisory recommendations. It should be available on call of the President or the joint Senate-House committee for recommendations on any matter pertaining to the problem of full utilization of resources, should be adequately staffed, should hold hearings, should set up advisory committees of business and other leaders, and should have the services of other government agencies at is disposal.

Covered Hopper Cars Find Increased Usage

New York

• • • **Increased use by** the railroads of the covered hopper car is evidenced by repeated orders from the various railroads according to R. A. Williams, vice-president in charge of sales, American Car & Foundry Co.

Mr. Williams reports that the company has received orders for the large capacity hopper cars from the following railroads: Missouri Pacific Lines, 100 70-ton steel covered hopper cars; Boston & Maine RR, 20 70-ton steel covered hopper cars.

These twin hopper cars having a capacity of approximately 2000 cu ft are used for transporting bulk commodities. The cars will be built at the ACF Madison, Ill., plant.

Information Free

(1) Plastics:

"The Watertown Book of Plastics" contains information on assembling, buffing, finishing, molding methods covering thermoplastic and thermosetting plastics. *Watertown Mfg. Co.*

(2) Fractional HP Drives:

Latest American fractional-hp Wedgbelt drive catalog contains complete price lists and specifications on complete fractional-hp line of sheaves and belts. Catalog also contains four pages of condensed and simplified drive tables covering a wide range of center distances and drive ratios. *American Pulley Co.*

(3) Ball Bearing Tester:

A production instrument for the testing of completed ball bearings is described in the Quality Control bulletin. The instrument, the Anderometer, permit checking of complete ball bearings for deviations of both balls and races from true circularity. *Physicists Research Co.*

(4) Valves:

Literature on steel bar stock valves with carbon or stainless steel bodies and stainless steel stems, especially designed for flow control in high pressure lines handling air, gas, oil, gasoline and other liquids. Feature of these valves is that stuffing box can be readily repacked when the valve is full open and under pressure. *Kitson Co.*

(5) Diesel Engine Overhaul:

Illustrated booklet describing in detail labor-saving, chemical short cuts for removing carbon, grease, oil, asphalt and tar from diesel engines are described, as well as a procedure for cleaning and descaling the cooling system. *Turco Products, Inc.*

(6) Industrial Tires:

Booklet opens with a discussion rubber industrial tires that give six-way savings to users—less hauling time, floor wear, noise and depreciation, reduced breakage and fewer accidents. Care and maintenance of industrial tires is another featured section. *B. F. Goodrich Co.*

(7) Grinding Problems:

Booklet is designed as a practical aid for the solution of the more common grinding problems. The problems have been carefully covered and answered by Allen Steele from his experience in the development, manufacture and application of grinding wheels. *Dayton Grinding Wheel Div., Simonds Worden White Co.*

(8) Processing Oils:

Bulletin describes the Buckeye process of cleaning, dehydrating, degasifying and stabilizing oils. *Buckeye Laboratories Corp.*

(9) Inserted Blade Cutters:

This 24-page booklet describes milling cutters of various types and sizes. Included also are interesting illustrations of special application cutters, and cutter sharpening suggestions. *Midwest Tool & Mfg. Co.*

(10) Angle Tool Attachments:

Booklet contains assembly and comparative dimension charts on *Invincible* angle tool, and a list of parts for heavy duty attachments. May be used with drills, taps, dies, counterbores, burrs, etc., for work in close spaces. May be driven by any power. *Invincible Tool Co.*

(11) Flow Meters:

Description and illustrations covering the Rota-Sleeve, an instrument for the measurement of large flows of liquids and gases, are given in this new bulletin, along with a discussion of other instruments. *Fischer & Porter Co.*

(12) Idler Backstands:

Typical Backstand unit installations are shown in this booklet. The advantages of such installations to firms engaged in metal grinding and finishing are fully covered. *Behr-Manning Corp.*

(13) Gages:

Complete information on this firm's line of visual gages and Universal Precisionaire given in two illustrated booklets. Tables give detailed specifications of gages. *The Sheffield Corp.*

(14) Grinding Wheel Care:

A handy pocket-size booklet excellent for foremen in the education of workers in protection and proper care of grinding wheels. Cartoons illustrate important "do" and "don'ts" compiled after a survey made among grinding wheel manufacturers. *Sterling Grinding Wheel Div., Cleveland Quarries Co.*

(15) Portable Spot Welders:

Pictures and line drawings show construction and versatility of this company's hydraulically operated 50, 75 and 100 kva welding guns. Other welding equipment also described. *Sciaky Bros.*

(16) Piping:

Illustrated booklets describing prefabricated piping, lapped joints and Globack joints. Tables showing maximum allowable working pressures for welding elbows and tees included. *Midwest Piping & Supply Co., Inc.*

(17) Pneumatic Fittings:

Catalog illustrates and describes the company's line of industrial air line equipment, including couplings, clamps, adapters, splicers, etc. *The Hansen Mfg. Co.*

(18) Steel Castings:

Designation chart for stainless, corrosion and heat resistant alloy steel castings, covering specification designations, analysis, physical properties and uses. *Empire Steel Castings, Inc.*

(19) Air Cylinders:

The new line of air cylinders and valves is illustrated and described in this catalog. Seven models of non-rotating, double-acting air cylinders are shown and complete detail of no-tie-rod construction is described by large cross-section views. *Gerotor May Corp.*

(20) Crush Form Grinding:

The new booklet presents for the first time authoritative facts on crush form grinding precision contours. The presentation describes the requirements of the entire process in detail and in pictorial form. Specific examples of completely engineered machines and how

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they are designed to crush and true the wheel, are presented graphically. *Thompson Grinder Co.*

(21) Aluminum Applications:

Brochure contains list of approximately 3500 applications for aluminum. This list of applications will prove of interest in connection with development of postwar products. *Aluminum Co. of America.*

(22) Battery Chargers:

Battery charger handbook lists advantages of battery power, gives outstanding construction features of two-bearing motor generators, as well as four and six bearing motor generators, and other information on battery charging equipment. *Electric Products Co.*

(23) Bronze:

Folders on Sabeco bronze offer information on advantages of Sabeco process of producing bronze from virgin metal, its advantages in saving time, money and increased efficiency, and recommended uses. A chart showing its availability in five grades is given along with data on Sabeco seals and split washers. *Saginaw Bearing Co.*

(24) Thread Gages:

Scope and quality of this company's thread gages are presented in booklet with special emphasis given to Stellite gages. Both working thread plug gages and setting thread plug gages are covered. Machine screw sizes and fractional sizes are given. *Cadillac Gage Co.*

(25) Heat Treating:

Vest pocket data book carries many tables of specifications on SAE steels, AISI (NE) steels and common tool and die steels, characteristics and applications of SAE steels, heat-treating recommendations of SAE steels and other steels. Furnaces, furnace atmospheres, furnace capacity and other data make complete the booklet. *Stewart Industrial Furnace Div., Chicago Flexible Shaft Co.*

(26) Threaded Fasteners:

Wall chart contains specifications and prices and other technical information of the following: Finished hexagon head cap screws, fillister head cap screws, flat head cap screws and case hardened steel square head and set screws, carriage bolts, machine bolts, lag, step, stove bolts, hexagon semi-finished nuts, hot pressed square and hexagon nuts and others. *Triplex Screw Co.*

(27) Roustabout Cranes:

A series of folders on the Roustabout cranes in capacities up to 7 tons, gives descriptions, features and specifications of the MC-1 mounted on Case model DI tractor and MC-2 mounted on Case model LA tractor, MC-4 and MC-1 and MC-2 mounted on International wheel tractors. *Hughes-Keenan Co.*

(28) Casting Salvage:

Illustrated bulletin describes new Mogul Circulator M-1500, for salvaging pressure castings, giving complete information as to use, specifications and price, as well as data and prices on Mogul-Cast-Seal. *Metallizing Co. of America.*

(29) Lubrication:

Advantages of centralized lubricating system when installing machine equipment for postwar operations are pointed out in this illustrated four-page folder. Farval lubricating systems, including both manual and automatic types, are covered in detail. *Farval Corp.*

(30) X-Ray Diffraction:

New 16-page illustrated booklet covers basic principles and theory of x-ray diffraction; the constitution of matter, and discusses many application problems at considerable length. *North American Philips Co., Inc.*

(31) Centrifugal Pumps:

Booklet contains illustrations and data on various types of side, double or single suction centrifugal pumps, horizontal split case double suction pump with single or double inlet impeller and others. Data on mechanical and horizontal balance is covered along with explanation of performance of various impellers. *Deming Co.*

(32) Seamless Tubing:

Technical handbook entitled "Seamless Mechanical Tubing—Carbon and Alloy Steels" is devoted to definitions, chemical analyses, tolerances, machining, testing and mill practices. Also featured are charts on AISI and SAE standard steel composition and national emergency steel compositions. *Ohio Seamless Tube Co.*

(33) Washroom Layouts:

Informative 12-page two-color publication contains numerous blue-print layouts involving the company's washfountains and showers. Included are scale model cutouts for those who desire to make their own washroom layouts. *Bradley Washfountain Co.*

(34) Liquid Envelope:

16-page illustrated booklet describes the use, properties and technical data on the company's peelable plastic film, Liquid Envelope, which is used to protect laid-up tools or equipment. *Better Finishes & Coatings, Inc.*

(35) Vibration Fatigue Testing:

Bulletin discusses vibration fatigue testing of finished assembly or product. Typical installations in electronic and other industrial laboratories are shown. *All American Tool & Mfg. Co.*

(36) Tube Working Tools:

Folder on tubing tools includes a handy tube-working tool selector. Tools can be used with copper, brass, aluminum, thinwall steel and similar tubing, for bending, cutting, flaring, coiling, etc. *Imperial Brass Mfg. Co.*

(37) Welding Accessories:

Booklet contains illustrations, descriptions, engineering data and current prices on the company's gas welding and cutting supplies and accessories. Information concerning properties and uses accompanies each article listed. *Air Reduction.*

(38) Tool Steel Tubing:

New catalog describes tool steel tubing and shows photographs of many applications as blanking and forming dies, punches, etc. Heat treating and how-to-order information and list of sizes available is included. *Bissett Steel Co.*

(39) Metallizing Gun:

Circular gives a description of the new Mogul Model F Metallizing gun along with information on construction features, including exploded view of gun parts, spraying speeds and gas consumption. *Metallizing Co. of America.*

(40) Heat Treating Furnaces:

Catalog describes furnaces for hardening high speed steel and carbon, alloy and stainless steel tools and dies, annealing, copper brazing, etc. Included is a section devoted to furnace atmosphere control. *C. I. Hayes, Inc.*

(41) Material Handling:

Booklet outlines simple, effective methods for handling materials and manufactured products economically and safely and explains how a planned system of materials transportation reduces costs in procurement, production and distribution. *Elwell-Parker Electric Co.*

(42) Hydraulic Press:

The Rodgers portable hydraulic press is completely described in this catalog. Specifications, capacities and other informative details are given, along with data on other Rodgers equipment. *Rodgers Hydraulic, Inc.*

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Warehouses Received 16 Pct of Finished Steel Output in 1945

Cleveland

• • • **Warehouses received** from producers approximately 9,200,000 net tons of finished steel products during 1945, according to the year-end report of Walter S. Doxsey, president of the American Steel Warehouse Assn., Inc.

While total shipments to warehouses in 1945 were estimated at the same total as in 1941, Mr. Doxsey's report pointed out that the portion of the total production of finished steel mill products delivered to warehouses during the year just closed was 16.6 pct, as compared with 14.7 pct in 1941.

Warehouses received 5,400,000 tons of general steel products in 1945, and distributors of these products handled tonnages that exceeded all previous records by a wide margin. In 1941, warehouses got 4,210,000 tons of general steel products.

Comparisons for the past five yr (in millions of net tons):

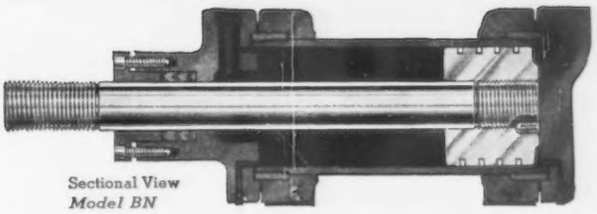
Year	Total Production of Finished Steel Mill Products	Total Shipments to Warehouses†	Pct of Total Production†	General Steel Products†	Merchant Steel Products†
1945*	56.0	9.2	16.6	5.4	3.8
1944	60.0	8.0	13.3	4.1	3.9
1943	60.0	6.8	11.3	3.5	3.3
1942	60.5	6.0	11.2	3.1	2.9
1941	60.5	9.2	14.7	4.2	5.0

(Merchant steel product heading includes merchant pipe and tubular products, wire rods, drawn wire products, tinplate and terne plate and galvanized sheets; the remainder are grouped under the general steel product heading. Figures do not include any surplus steel delivered to warehouses.)

*Estimated. †American Steel Warehouse Assn.

Other highlights of Mr. Doxsey's report follow:

"Because of the severe restrictions on the production and sales of merchant steel products during the war period, it is reasonable to assume that the pent-up demand for these items may be relatively greater than the need for the heavier industrial steel products. Had it been possible for warehouses to meet these requirements for merchant steel products since VJ-Day, to the same extent that they have taken care of industrial consumers, total shipments to warehouses in 1945 undoubtedly would have reached an all-time record figure consid-



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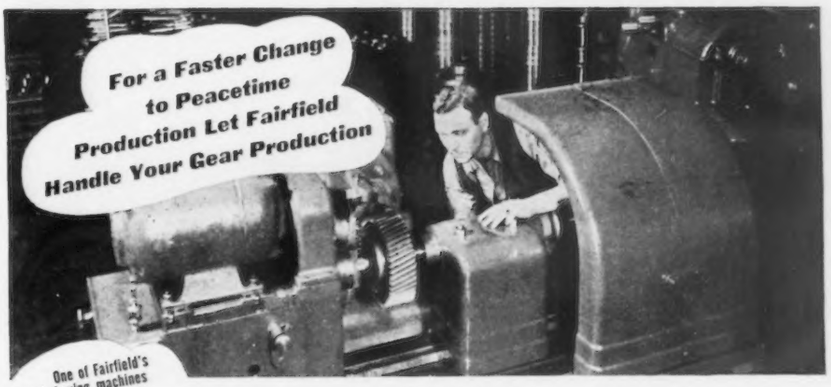
HANNIFIN *Hydraulic Cylinders*



One of Fairfield's 24" shaving machines which crown shaves internal and external gears.

One way many plants are hastening the switch from wartime to peacetime production is to let Fairfield handle their gear production problems. Fairfield provides for them, and will provide for you, fast production of all kinds of gears, differentials, splined shafts and allied items.

At Fairfield there are the finest machines, enough of them for almost any production run, skilled machinists and an experienced engineering staff to relieve you of worry of producing these vital component parts. If yours is a gear problem, write to Fairfield for information. Ask for the illustrated brochure describing Fairfield's manufacturing facilities. There's no obligation.

FAIRFIELD MANUFACTURING COMPANY
305 S. Earl Avenue, LaFayette, Indiana

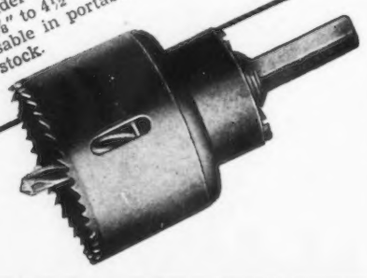
ARMY E NAVY
FAIRFIELD for FINE GEARS

Fast Tough

Heavy feed at high speed!

Heavy feed at high speed spells doom to the ordinary hack saw blade; down-time for your machine, extra expense in money, man hours, and production. The MARVEL Hack Saw Blade, because it is positively *unbreakable* under these conditions, should be "a must" tool in every efficiently operated shop. A tough alloy steel back is electrically welded to high speed steel teeth, producing a blade that can be pulled to almost unlimited tension; can withstand extra heavy feeds and the heat and abrasion of high speed heavy duty sawing.

The same exclusive *unbreakable* feature of MARVEL Hack Saw Blades is also a feature of MARVEL Hole Saws, giving these saws the ability to stand up under abuse. MARVEL Hole Saws cut holes from 5/8" to 4 1/2" diameter in stock up to 1 1/8" thick. Usable in portable drill, drill press, or lathe tail stock.



Complete Range of Metal Sawing Machines

Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price, and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course)

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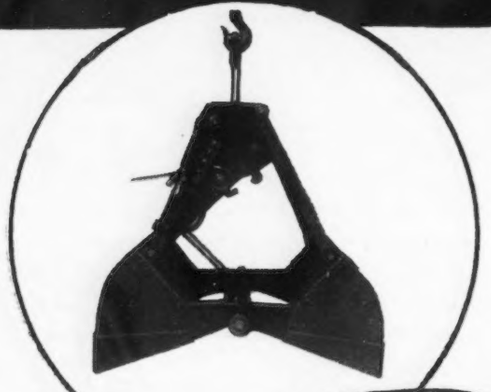
ERIE BUCKETS



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erably in excess of 10,000,000 tons.

"Mill order books which are filled many months into the future and unabated clamors for all kinds and types of steel mill products continue to puzzle even the most experienced observers. This pressure for steel has been bolstered by the threat of an all-out strike in January. Markets which normally account for bulk tonnages are, for the most part, either normal or subnormal. The automotive industry is consuming only dribbles of steel and the prospects of its assuming its position as a first-rank customer of the steel industry in the immediate future are not too bright.

"Rumors that motor car builders are storing huge quantities of sheets can be largely discounted. Shipbuilding demands have dropped to nil. The construction industry has few sizable projects under way and not many of consequence in the offing. While railroads are building some new equipment and have some maintenance programs on hand, their needs do not account for impressive quantities of steel. Export customers are not being favored. Either huge and mysterious inventories are being accumulated or mill order books are being inflated with duplicate and triplicate orders. If this is not true, then there is occurring in industry a phenomenon which neither practical steel men nor theoretical economists can fathom.

"**This steel is not** going into warehouse inventories. Distributors' stocks rapidly are declining sharply. They, too, are confronted with inflated order books reminiscent of the hectic weeks of 1941 when warehouse orders jumped from pounds to tons and from truck loads to car loads. As producers reject or quote extended deliveries on smaller orders, the load on the warehouses increases. Stocks of all kinds of coated and uncoated sheets are virtually depleted. From day to day more and more bar racks are being emptied. Despite all the efforts distributors make to hold their shipments to normal quantities for immediate requirements, their inventories are shrinking and becoming unbalanced.

"Because of price ceilings which dictate out-of-pocket operations, some mills have stopped or curtailed production of certain

items. In other instances, where heavy freight absorptions by the mills are involved, customers are having difficulty in placing orders.

"Settlement of the steel strike, if it occurs, very likely will call for increases in the prices of steel mill products as well as advances in the wages of steel mill workers. Ultimately, some price advances seem certain. The amounts, products and date cannot be forecast today, although President Truman's recent action suggests sometime late in February. Possibly, upward adjustments will be made in extras as well as in base prices.

"OPA is still at work on a revised RPS No. 49 which will include what remains of the original order, its several appendices and the 36 amendments issued to date. This revised edition will correct errors and deficiencies in the original order and amendments and, insofar as possible, it will bring together under appropriate headings all of the provisions pertaining to any one subject. In the meantime, we are advised, another amendment will be issued to permit warehouses to pass along to their customers the extras some of the mills are now charging for aluminum killed, deep-drawing sheets.

"That OPA has held steel prices in control cannot be denied. We should not completely forget experiences during and following World War I. In a runaway market during the early months of that war, tinplate went to $240 a ton and was frozen at $160. Plates ran up to $180 and structurals to $125, subsequently to be frozen at $62 and $60 respectively. While dollar and cents figures for warehouse prices during this period are not available, we know that from a prewar index of 100 warehouse prices went to a peak of 370 and finally were frozen at 235. Then after the war came the crash.

"Out of all the criticism and dissatisfaction over surplus steel we may draw one reassuring conclusion. There isn't nearly so much of it as most experts anticipated. In view of the present shortages of new mill steel, there seems to be a serious scarcity of surplus material. At the moment anyhow, fears that surplus stocks of steel will overhang and threaten warehouse markets for years

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THE ABBOTT BALL COMPANY HARTFORD 10, CONN. U.S.A.

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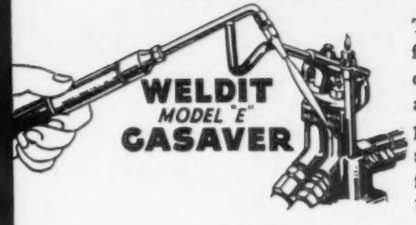
AT LOWER PRODUCTION COSTS



The Weldit Gasaver shuts off the welding flame when not in use. . . . Conserves essential materials by cutting oxygen and acetylene consumption as much as *fifty* per cent. Prevents injury to workmen—or sudden fires—from dangerous idle torch flames. . . . Adjustment remains unaltered between welds.

When the Weldit Gasaver has been installed, you simply hang idle torch on the handy lever rod. Weight of torch pulls rod down, thus automatically shutting off supply lines. Relight instantly by passing torch over Gasaver pilot light. No bother. . . . No time lost. . . . *No readjusting required.* . . . Price $10.00 at Detroit. Order today.

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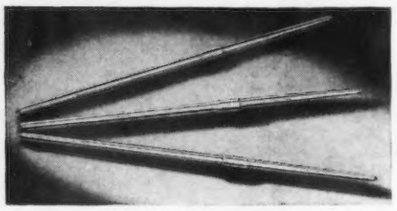
PRECISION PARTS

SPINNING THE THREAD OF THE FUTURE



Spinning spindles, whirring bobbins, the shuttling back and forth of warp and woof . . . these are sweet sounds to the ears of a textile-starved America. Spindles that spin so speedily have to be built with fine-spun accuracy, and the incredible accuracy Ace built into parts for guns and engines, radar and radio, is now being built into parts for the machines of peace.

This slender spindle, a very essential part of a textile machine, is a perfect example of the ability of Ace to do fine precision-work on a mass-production basis. Twenty-four different operations were performed to produce its 22 dimensions . . . dimensions that had to be held to a tolerance of .0005″ . . . roughing, heat-treating, straightening, finishing. Two finishing-operations were done by centerless grinding, seven by cylindrical grinding, producing tapers and radii where required. Periodic inspections kept overall straightness within .002″.

Incredible accuracy on a mass-production basis . . . that's the story of Ace. For small parts and assemblies that require stamping, machining, heat-treating, and grinding . . . all under a single roof, single responsibility . . . it will pay you to have an Ace up your sleeve. Send us a sample, sketch or blueprint for quotation.

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to come are not justified. Surplus stocks are being taken just as rapidly as they become available, in most instances, and are being utilized almost immediately in the production of capital and civilian goods.

"Surplus steel arises from several sources. In the first place, some steel is owned outright by federal agencies, such as the Navy and divisions of the Army. So far little of this material has been declared surplus.

"Some war contractors have stocks of steel which they may sell at any price (not exceeding the ceiling) to anyone at any point. Some of this material has been retained for use in future manufacturing operations.

"Other war contractors have surplus steel which is involved in contract terminations. These contractors advertise their stocks for sale and get sealed bids which are opened in the presence of contract officers. Certain pricing restrictions apply to such sales. These sales account for most of the surplus steel which has reached the market thus far. It is reported that more than 80 pct of the contract termination cases were closed by Dec. 31; therefore, the volume of surplus steel from such sources very likely will decline during the early months of 1946."

Pipe Nipple Standard Set

New York

• • • **The National Bureau** of Standards has announced a newly adopted commercial standard for pipe nipples of brass, copper, steel and wrought iron, CS5-46, effective for new production after Feb. 15, 1946.

The new standard represents a revision and consolidation of commercial standards CS5-29, CS6-31 and CS10-29, first circulated for the approval of the industry in January, 1940. The standard incorporates a revision submitted by the National Assn. of Pipe Nipple Mfrs. in November 1945.

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